



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Southwest Region  
501 West Ocean Boulevard, Suite 4200  
Long Beach, California 90802-4213

MAY 20 2002

In Reply Refer To:  
SWR-00-SA-5928:FKF

Mr. Tom Cavanaugh  
Chief, Sacramento Valley Office  
U. S. Army Corps of Engineers  
Regulatory Branch  
1325 J Street  
Sacramento, California 95814-2922

Dear Mr. Cavanaugh:

Enclosed is a biological opinion (Enclosure 1) prepared pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531 *et seq.*) which analyzes impacts to threatened Central Valley steelhead (*Oncorhynchus mykiss*) and their critical habitat resulting from the proposed Teichert Gravel Mining project. Also, as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended (16 U.S.C. 1801 *et seq.*), the National Marine Fisheries Service's (NMFS) Essential Fish Habitat (EFH) Conservation Recommendations for Pacific coast salmon which may be affected by the proposed action also are enclosed (Enclosure 2).

#### Endangered Species Act Consultation

Based on the best available scientific and commercial information, NMFS concludes that the proposed project is not likely to jeopardize the continued existence of Central Valley steelhead or result in the destruction or adverse modification of their critical habitat. An Incidental Take Statement is included with the biological opinion that identifies Reasonable and Prudent Measures and Terms and Conditions to implement those measures, to ensure that the impacts of any incidental take are minimized.

The attached biological opinion contains an analysis of the effects of the proposed action on designated critical habitat. Shortly before the issuance of this opinion, however, a Federal court vacated the rule designating critical habitat for the Central Valley steelhead ESU. The analysis and conclusions regarding critical habitat remain informative for our application of the jeopardy standard even though they no longer have independent legal significance. Also, in the event critical habitat should be redesignated before this action is fully implemented, the analysis will be relevant when determining whether a reinitiation of consultation would be necessary at that time. For these reasons and the need to timely issue this opinion, our critical habitat analysis remains.



Consultation with NMFS must be reinitiated if (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals that the project may affect listed species in a manner or to an extent not previously considered; (3) the action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological opinion; or (4) a new species is listed, or critical habitat is designated that may be affected by the project.

#### Essential Fish Habitat Consultation

NMFS has provided four EFH Conservation Recommendations for Pacific salmon. The U.S. Army Corps of Engineers (Corps) has a statutory requirement under section 305(b)(4)(B) of the MSFCMA to submit a detailed response in writing to NMFS that includes a description of measures proposed for avoiding, mitigating, or offsetting the impact of the activity on EFH, as required by section 305(b)(4)(B) of the MSFCMA and 50 CFR 600.920(j) within 30 days. If unable to complete a final response within 30 days of final approval, the Corps should provide NMFS an interim written response within 30 days. The Corps should then provide a detailed response.

If you have any questions about this consultation please contact Ms. F. Kelly Finn in our Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, CA 95814. Ms. Finn may be reached by telephone at (916) 930-3600 or by Fax at (916) 930-3629.

Sincerely,



Rodney R. McInnis  
Acting Regional Administrator

cc: NMFS-PRD, Long Beach, CA  
Stephen A. Meyer, ASAC, NMFS, Sacramento, CA ✓  
Susan Lee, Jones and Stokes  
Troy Reimche, Teichert Inc.  
Roberta Gerson, U.S. Fish and Wildlife Service, Sacramento, CA

## **BIOLOGICAL OPINION**

**AGENCY:** United States Army Corps of Engineers, Sacramento District

**ACTIVITIES:** Issuance of a Section 404 Permit to Teichert, Inc. for Gravel Mining and Associated Activities

**CONSULTATION**  
**CONDUCTED BY:** National Marine Fisheries Service, Southwest Region

**DATE ISSUED:** MAY 20 2002

### **I. CONSULTATION HISTORY**

In April 1999 Teichert Inc. (Teichert) applied for a Department of Army permit, under the authority of Section 404 of the Clean Water Act, from the U.S. Army Corps of Engineers (Corps) to conduct activities associated with excavation of approximately 700 acres for sand and gravel resources and 300 acres for granite resources in the Coon Creek watershed. A biological assessment of the potential impacts to listed salmonids, completed in April 1999, was received by NMFS in July 1999. A Draft Environmental Impact Report (DEIR) was issued in March 1999. After receiving public comments, Placer County Planning Department, the state lead agency, issued and distributed a Revised DEIR in November 2000, which was received by NMFS in December 2000. Meetings took place between NMFS, Jones and Stokes (JSA) personnel, and the applicant, Teichert, during the fall of 2000 to discuss measures which could be implemented to minimize the potential for adverse effects associated with mining adjacent to Coon Creek.

The Corps requested consultation with NMFS for the Section 404 permit application because activities associated with the permit may adversely affect listed species pursuant to the Endangered Species Act. Initially, the Corps requested formal Section 7 consultation on July 22, 1999 and NMFS requested a 120-day extension on December 1, 1999. Because the DEIR was being modified, the project description was being negotiated, and due to personnel changes at NMFS, the starting date for the Section 7 consultation was extended.

With the receipt of the revised DEIR which contained changes in the project description in mid-December 2000, the NMFS began the pre-consultation period for this biological opinion. On January 22, 2001, a joint field review was conducted between NMFS, JSA, and Teichert personnel. NMFS made suggestions to further minimize the potential for adverse modification to

critical habitat, and another meeting was held on August 22, 2001, with a follow-up site visit on September 6, 2001. The meeting and site visit resulted in minor changes to the project description and technical assistance was provided by NMFS Habitat Conservation Division engineering staff to the project applicant. Additional information and a map was provided by the applicant to NMFS on January 18, 2002. Consultation on the proposed project started in October 2001, however, details and additional information was still being submitted through January 2002. During February 2002, the applicant and NMFS exchanged phone calls regarding NMFS' concerns and suggestions to minimize impacts. On March 8, 2002, NMFS received additional information from the applicant describing several changes to the proposed project description which are also described in the Final Environmental Impact Report (FEIR) as the Mitigated Design Alternative. Teichert has now revised its application to be consistent with the Mitigated Design Alternative and the revised application has been submitted to Placer County.

Because the Section 404 permit will have a duration of five years, NMFS informed the applicant that they would only be covered by this biological opinion and any accompanying Incidental Take Statement during the period of time covered under the Department of Army permit and not for the anticipated thirty-five to forty year duration of the project, although, as required by regulation, NMFS must consider the full scope of the project in this analysis. If ensuing Section 404 permits are required, NMFS would be able to tier off this biological opinion for the next period of time covered by future permits. The applicant may also pursue additional coverage beyond the time period covered by the Section 7 consultation through the ESA Section 10(a)(1)(B) incidental take permit process. A complete administrative record for this consultation is on file at the NMFS, Sacramento Area office.

## **II. DESCRIPTION OF THE PROPOSED ACTION**

The Corps proposes to grant a Department of Army Section 404 permit to fill 4.64 acres of waters of the United States for the proposed Teichert gravel mining operation located in the southwestern portion of unincorporated Placer County. Teichert has proposed to conduct a phased mining and reclamation project and construct an aggregate processing plant about four miles north of the City of Lincoln, Placer County, California within the Coon Creek watershed. The mining site parcel is bisected by Coon Creek and a tributary creek, Doty Ravine.

Mining will be conducted in nine aggregate (sand and gravel) phases and five hard rock (granite) phases. Sand and gravel mining is expected to take 35-40 years and granite mining is expected to continue throughout the projected project duration of 35-40 years. Mined aggregate and hard rock will be processed onsite. For a more detailed description of any aspect of the project description see the DEIR (March 1999), the Revised DEIR (November 2000), and the Mitigated Design Alternative in the FEIR. Teichert estimates that approximately 1-2 million tons of aggregate material would be sold from the site each year. They contend the extensive growth and planned development in Placer and nearby counties provides the need for the project.

Teichert has purchased 3455 acres of land on both sides of Coon Creek with the intention of mining 999.2 acres and preserving approximately 2456 acres. Purchased land includes private ranchlands, including the Hofman Ranch and portions of the Wilson property, which may be

referred to in this opinion. Mining or processing will occur on approximately 1000 acres while the remaining 2,455 acres will not be mined but will be set aside for agriculture and open space uses through conservation easements.

The proposed mining operation will occur on land adjacent to Coon Creek and Doty Ravine, a tributary to Coon Creek. These waters are within federally-designated critical habitat for Central Valley steelhead, and they may contain threatened Central Valley steelhead (*Oncorhynchus mykiss*) and candidate fall-run chinook salmon (*Oncorhynchus tshawytscha*).

The purposes of the activity are to:

- mine 37 million tons of sand and gravel resources from 671 ± acres, and 34 million tons of granite resources from approximately 144 ± acres, adjacent to Coon Creek;
- operate a facility for mining and processing of resources for a period of 35-40 years;
- provide a reliable, continuous, and cost-effective supply of high-quality aggregate to meet market demands for a variety of products used in construction near planned growth areas in south Placer County;
- restore degraded riparian habitat in the Coon Creek corridor; and
- preserve and protect buffer areas, wetland preserve and mitigation areas, Coon Creek, and non-mined agricultural land in perpetuity.

The sand and gravel deposits to be targeted by mining are located on the south side of Coon Creek and encompass approximately 671 acres and 37 million tons of material. Mined areas are within the 100-year floodplain of lower Coon Creek on former floodplain areas, called terraces. Average mining depth will be 45 feet, ranging from 25 to 70 feet. Processing these deposits will require dewatering to effect dry-pit mining. Extracted water will be pumped to onsite irrigation or drainage ditches in order for sediment to settle out before the water is released into any water course. Groundwater would be pumped from the alluvial and granite pits to keep them dewatered during mining. This pumping would lower the water table near the pits, and lowering the water table near Coon Creek would induce seepage from the creek or intercept groundwater that would have seeped into the creek. Proposed mitigation for the loss of flow is to construct a horizontal flow barrier to maintain water levels in the creek. To reduce potential infiltration from Coon Creek into the mining area, Teichert would place reclamation backfill that has an appropriate low permeability directly against the mining slopes near the creek.

Granite resources are located in the eastern section of the property on both sides of Coon Creek, however, only 144 acres of granitic deposits on the south side of the creek will be mined. These deposits will be mined in a single phase lasting 35 - 40 years. Mining the granitic deposits also requires dewatering to effectively extract the deposit. The granite mining phase will utilize blasting which is anticipated to occur two to six times a month.

As part of the mining operation, haul roads will be constructed and a bridge crossing Coon Creek is proposed. The specific bridge design has not yet been submitted to NMFS, however, the DEIR (March 1999) Figure 2-30 shows a plan drawing of the bridge. The bridge has two abutments outside the low flow channel and one center pier located in the channel which is needed to make the bridge able to withstand heavy loads (T. Reimche, Teichert Inc., pers.comm.). The haul bridge would be designed as a 24-ft-wide double-span bridge using a single concrete pier in the center of the channel and 2 abutments on the banks. No concrete aprons or culverts would be used.

The applicant also proposes to armor a portion of the bank of Coon Creek in the area where the flow is most likely to leave the channel during a high flow event. The construction period for the in-channel bridge and hardened overflow area would be limited to June 1 to November 1 to avoid impacts to migrating fish. The hardened surface could consist of several different materials, including rock riprap, gabions, cabled concrete blocks, and soil cement. The hydraulic design of the overflow will calculate overflow velocities and peak flows to determine flow area width, configuration, and the preferred revetment material. The hardened overflow area would be constructed within the first ten years of aggregate mining. Prior to construction of the overflow area, the applicant shall submit Improvement Plans and specifications to the Placer County Department of Public Works for approval.

The biological assessment includes a conservation plan and a mitigation plan for potential impacts to CV steelhead and their habitat. It also includes a riparian habitat restoration plan that contains activities that should improve habitat conditions for aquatic organisms including fall-run chinook salmon and CV steelhead. Key elements of these plans are briefly discussed below. For a detailed description of these and other mitigation measures refer to the Revised DEIR (November 2000).

#### Instream Flow Protection

*Hardened overflow bank area.* Overbank flow from a flood event with an average recurrence interval of 20 years or greater could inundate the mining pit (Murray, Burns & Kienlen Consulting Engineers 1996). Uncontrolled filling of the pit may lead to headcutting and severe erosion within Coon Creek. Unless the original stream bank is repaired after a breach, Coon Creek could continue to flow into the pit even after flooding ceases. To minimize the chances of this occurring, Teichert would design and construct a hardened bank overflow area during the first 10 years of aggregate mining at the point of anticipated overflow to the reclaimed agricultural land. The hardened surface will be provided within the existing bank to direct overflow. The hardened surface may consist of several different materials including rock riprap, gabions, cabled concrete blocks, and soil cement. Teichert has also installed a stream gauge on Coon Creek and will grant Placer County Flood Control and Water Conservation District an easement to install telemetry equipment at the site to expand its Alert Flood Warning System.

*Streamflow augmentation.* Teichert has proposed to convert 180 acres of non-irrigated land north and south of Doty Ravine to irrigated pastureland using surface water purchased by Nevada Irrigation District (NID) and delivered through Coon Creek. Flows in Coon Creek during the period from June through November consist almost entirely of NID releases. Streamflows in Coon Creek may be augmented to pre-project levels to offset any loss resulting from mine

dewatering activities. One of the following sources would be used: (1) use the Coon Creek channel to deliver water to the plan site for aggregate processing; (2) discharge water from dewatering activities into the creek; or (3) use the Coon Creek channel to deliver NID's water for downstream irrigation.

*Streamflow monitoring.* Streamflows in Coon Creek would be monitored at two locations, near the Hofman Bridge and near the proposed haul road bridge. These data will be used to determine if streamflows are being altered by mining practices and if steps should be taken to restore flows. Details of the monitoring protocol have not yet been fully described.

### Water Quality Measures

Mining activities may cause a degradation of water quality depending on soil erosion potential; mining practices; the frequency, magnitude, and duration of precipitation events; and proximity to stream channels. The applicant will be required to be in compliance with Section 401 of the Clean Water Act through obtaining a water quality certification from the Regional Water Quality Control Board (RWQCB). Compliance with standards set in the RWQCB certification would provide water quality parameters designed to protect the beneficial use of coldwater fishery resources from potential increases in suspended sediment, pollutants, and water temperature. Measures to comply with Section 401 include use of best management practices for stormwater runoff, implementation of a detailed erosion control and restoration plan before and after construction, and use of desilting basins for dewatering operations. Monitoring and inspection for water quality problems also would be instituted. Teichert would monitor water turbidity where dewatering water would be discharged into ditches currently used for irrigation tailwater. If water quality parameters including turbidity levels are acceptable, the water would be allowed to flow into Doty Ravine or Coon Creek or would be used at the plant site for aggregate processing operations. If turbidity levels are unacceptable, best management practices would be used, which may include, but would not be limited to, discharge of water to sedimentation basins. Best management practices would be used to minimize sediment and debris in dewatering water discharged into the onsite drainage system. Sediment ponds may be used as a BMP to control turbidity and sedimentation in water discharged into Coon Creek, as required to meet water quality standards of the National Pollutant Discharge Elimination System (NPDES). The proposed project is subject to construction-related stormwater permit requirements under the federal Clean Water Act. A Storm Water Pollution Prevention Plan (SWPPP) would be prepared as required under the NPDES permit to minimize the possibility of introducing pollutants into aquatic habitats. Teichert has not yet acquired the NPDES permit, nor has the SWPPP been formulated.

### Blasting Impact Control

In order to avoid significant adverse impacts to spawning and egg incubation during blasting activities, Teichert would conduct stream surveys in Coon Creek prior to blasting that occurs within 1600 ft of the stream channel, however, blasting would not occur within 1000' of the creek. These surveys would be conducted on the following schedule: (1) biweekly from October 1 through December 15 for fall-run chinook salmon redds; (2) biweekly from February 1 through April 30 for steelhead redds; and (3) monthly from February 1 through June 30 for juvenile and

adult steelhead and chinook salmon. Surveys for redds would be discontinued when water temperatures exceed 65 °F, and for juveniles and adults when water temperatures exceed 75 °F. The surveys would be discontinued after 5 consecutive years in which no chinook salmon or steelhead redds had been detected. In addition, the surveys for juveniles and adults would stop if the California Department of Fish and Game (DFG) released hatchery-produced juvenile chinook salmon or steelhead into Coon Creek.

Setback distances for blasting activities would be established based on the criteria derived from Canadian guidelines for blasting activities (see Wright and Hopky 1998) and the results of the surveys. Setback distances during the time periods when juveniles and adults are present are specified in one table; setback distances during the periods when redds are present are specified in another table (see Attachment A).

### Reclamation Plan

The reclamation process involves replacing overburden and topsoil onto mined surfaces, or reshaping cut slopes that overlay aggregate or granite resources, and then revegetating these surfaces for agricultural or wildlife habitat. For mined areas south of Coon Creek, the overburden and topsoil available for reclamation were balanced against the water demands of the potential reclaimed agricultural or wildlife habitats. The results of the analysis, done by Luhdorff and Scalmanini (1997), is a plan that includes one sand and gravel quarry lake and one granite quarry lake. Each lake is expected to retain a nearly constant year-round water surface elevation of 123 feet. These two lakes would be 222.2 and 205.3 acres in size. Employing the same process for the granite quarry on the north side of Coon Creek, it was determined that the north lake would have a water surface elevation that receded during the year, and that water would be diverted from upland and watershed runoff or winter floodflows into the lake to fill the lake to the proposed 145 foot water surface elevation. This lake would encompass 89.6 acres.

Of the 2456 unmined acres, 1293 acres will continue to be used as grazing land and existing irrigated pasture, 461 acres will be converted to prime agriculture land through permanent agricultural easements, 180 acres will be converted to irrigated pasture, 187 acres will be in the Coon Creek Riparian Habitat Restoration Area through permanent preservation easement, and 335 acres will be Wetland Creation and Fairy Shrimp Habitat preservation Areas under a permanent wetland preservation easement. After mining is complete, the 999.2 acres of mined land will be reclaimed. The reclamation plan will contain 270.5 acres of restored agricultural land under permanent agricultural easement, 76 acres of restored grazing land under permanent agricultural easements, 135.6 acres of restored wildlife habitat, and 517.1 acres of reclamation ponds. Teichert's plan includes creating three large reclamation ponds in areas where pit mining had occurred, adjacent to Coon Creek. The ponds would be 225, 205, and 60 acres in size.

### Riparian Corridor Protection and Restoration Plan

The Coon Creek stream corridor would be managed, as described in the Coon Creek Riparian Habitat Restoration Plan, to protect existing and restored habitats. Adjacent land uses would be designed to avoid direct and indirect impacts along the stream corridor. Teichert or its designee would ensure to the fullest extent possible that unauthorized activities in Coon Creek or the

riparian corridor are prohibited. Such unauthorized activities include altering existing hydrology or topography; affecting or replacing existing native vegetation; dumping, burning, or burying refuse or fill material; placing or constructing structures; conducting fire protection activities; and using pesticides in mitigation areas.

Teichert has proposed various measures to provide active and passive restoration along the Coon Creek corridor. The passive measures include: (1) establishing a minimum 100-ft mining setback from the dripline of riparian growth along the north and south sides of Coon Creek; (2) fencing the entire 187.1-acre Coon Creek corridor within 1 year of the commencement of mining at the site. The fencing would be constructed of four-strand barbed wire. The fencing would be located approximately 50 ft from the dripline of oaks, except around the two farm compounds and where fences already exist. Approximately 3,000 ft of stream corridor on the Hofman Ranch was fenced in 1997. Cattle-crossing areas would be created at five locations within the fenced area; and (3) removing and relocating the 18-acre feedlot north of Coon Creek on the Hofman Ranch from the creek corridor to a site away from the creek within 2 years of the commencement of mining at the site. The feedlot area would be disced and broadcast-seeded with a seed mix of blando brome and rose clover.

Active restoration measures include: (1) commencing arundo removal along the entire creek corridor, by mechanical means and herbicides approved by the U.S. Environmental Protection Agency (EPA), within one year of commencement of mining at the site; and (2) planting three active restoration areas totaling 45 acres with native species within two years of the commencement of mining at the site. Planting would occur at designated areas along Coon Creek's upper banks and terraces where natural regeneration may be limited because of compacted soils and invasive weeds. A total of 45 acres on the Hofman Ranch would be planted with approximately 3,550 native trees and shrubs. Target plant species would include valley oak, live oak, several species of willows, cottonwood, coffeeberry, elderberry, Oregon ash, box elder, and other riparian species native to the eastern Sacramento Valley. Teichert has established a performance goal of a 60 percent survival rate at the end of the fifth year after planting all target species. Vegetation would be monitored annually for five years to assess the condition and success of the plantings. A minimum of ten 10-meter transects and photo stations would be established to evaluate recolonization of target species. Additional planting would occur if the results of the monitoring indicate that the performance goal has not been achieved.

### Fish Migration Enhancement

There are several diversions and flashboard dams on Coon Creek which may impede upstream migration. In the vicinity of the proposed project area, located at Township 13N, Range 06E, there are four appropriative water rights holders which have a maximum diversion rate of 1.3 - 5 cfs, and operate from as early as April 1<sup>st</sup> and until as late as November 30<sup>th</sup>. Ranch property acquired by Teichert as part of this project has a diversion with a flashboard dam. Teichert would construct a fish ladder adjacent to the flashboard dam on the Wilson Ranch within 2 years of the commencement of mining activities. The fish ladder would be designed to provide adult and juvenile fish passage around the existing dam.

### Environmental Awareness Training

All project personnel would participate in a worker environmental awareness program. Workers would be informed about the sensitive biological resources associated with the project and that disturbance of listed species or designated critical habitat is a violation of the ESA.

### Action Area

An action area is defined as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 CFR 402.02). For the purposes of this Opinion, the action area includes the Coon Creek drainage from just above the Gladding Road bridge downstream Coon Creek until it flows into the Cross Canal, and including the confluence with Doty Ravine and upstream Doty Ravine approximately one mile.

## **III. STATUS OF LISTED SPECIES AND CRITICAL HABITAT**

### **Central Valley Steelhead—Threatened: Population Trends, Life History, and Biological Requirements**

Effective May 18, 1999, NMFS listed the Central Valley steelhead evolutionarily significant unit (ESU) as threatened under the ESA (63 FR 13347). Central Valley steelhead once ranged throughout most of the tributaries and headwaters of the Sacramento and San Joaquin river basins prior to the dam construction and watershed development of the 19th and 20th centuries (McEwan and Jackson 1996). Historical documentation shows that steelhead were once widespread throughout the San Joaquin River system (CALFED 1999). In the early 1960s, the California Fish and Wildlife Plan estimated a total run size of about 40,000 adults for the entire Central Valley and San Francisco Bay (California Department of Fish and Game 1965). The annual run size for this ESU in 1991–1992 was probably fewer than 10,000 fish, based on dam counts, hatchery returns, and past spawning surveys (McEwan and Jackson 1996).

Estimates of historical habitat for steelhead can be based on estimates of historical habitat for chinook salmon. Habitat loss for steelhead, however, is probably greater than habitat loss for salmon, because steelhead ascend higher into the drainages than do chinook salmon (Yoshiyama et al. 1996). Clark (1929) estimated that originally there were 6,000 miles of salmon habitat in the Central Valley system and that 80% of this habitat had been lost by 1928; the basis for Clark's estimate is not known. Yoshiyama et al. (1996) calculated that roughly 2,000 miles of salmon habitat was actually available before dam construction and mining and concluded that 82 percent of what was present is not accessible today. Whether Clark's or Yoshiyama's estimate is used, it is clear that only remnants of the former steelhead range in the Central Valley remain accessible today.

Impassable dams block access to most of the historical headwater spawning and rearing habitat of Central Valley steelhead. In addition, much of the remaining accessible spawning and rearing habitat is severely degraded by elevated water temperatures, agricultural and municipal water diversions, unscreened and poorly screened water intakes, restricted and regulated streamflows,

levee and bank stabilization projects, and poor quality and quantity of riparian and shaded riverine aquatic (SRA) cover (Busby et al. 1996). Reynolds et al. (1993) reported that 95 percent of salmonid habitat in California's Central Valley has been lost, mainly due to mining and water development activities. They also noted that declines in Central Valley steelhead stocks are due mostly to water development resulting in inadequate flows, flow fluctuations, blockages, and entrainment into diversions.

At present, wild steelhead stocks appear to be confined mostly to upper Sacramento River tributaries, such as Antelope, Deer, and Mill Creeks and the Yuba River (McEwan and Jackson 1996). Naturally spawning populations are also known to occur in Butte Creek and the upper Sacramento, Feather, American, Mokelumne, and Stanislaus Rivers (CALFED 1999). However, the presence of naturally spawning populations appears to correlate well with the presence of fisheries monitoring programs, and recent implementation of new monitoring efforts has found steelhead in streams previously thought not to contain steelhead populations, such as Auburn Ravine, Dry Creek, the Stanislaus, and the Calaveras Rivers. It is possible that other naturally spawning populations exist in Central Valley streams but have not been detected because of the lack of monitoring or research programs (IEP Steelhead Project Work Team 1999).

All Central Valley steelhead are considered winter-run steelhead (McEwan and Jackson 1996), although there are indications that summer steelhead were present in the Sacramento River system prior to the commencement of large-scale dam construction in the 1940s (IEP Steelhead Project Work Team 1999).

Adult steelhead migrate upstream in the Sacramento River mainstem from July through March, with peaks in September and February (Bailey 1954, Hallock et al. 1961). The timing of upstream migration is generally correlated with higher flow events, such as freshets or sand bar breaches, and associated lower water temperatures. The preferred temperatures for upstream migration are between 46 degrees Fahrenheit (°F) and 52°F (Reiser and Bjornn 1979, Bovee 1978, Bell 1986). Unusual stream temperatures during upstream migration periods can alter or delay migration timing, accelerate or retard migrations, and increase fish susceptibility to disease. The minimum water depth necessary for successful upstream passage is 18 centimeters (cm) (Thompson 1972). Velocities of 3–4 meters per second approach the upper swimming ability of steelhead and may retard upstream migration (Reiser and Bjornn 1979).

Spawning may begin as early as late December and can extend into April with peaks from January through March (Hallock et al. 1961). Unlike chinook salmon, steelhead are capable of repeat spawning. Some may return to the ocean and repeat the spawning cycle for two or three years; the percentage of repeat spawners, however, is generally low (Busby et al. 1996). Steelhead spawn in cool, clear streams that have suitable gravel size, depth, and current velocity. Intermittent streams may be used for spawning (Barnhart 1986, Everest 1973). Gravels 1.3–11.7 cm in diameter (Reiser and Bjornn 1979) and flows of approximately 40–90 cm/second (Smith 1973) generally are preferred by steelhead. Reiser and Bjornn (1979) reported that steelhead prefer a water depth of 24 cm or more for spawning. The survival of embryos is reduced when fines of less than 6.4 millimeters (mm) comprise 20–25 percent of the substrate. Studies have shown that embryo survival improves when intragravel velocities exceed 20 cm/hour (Phillips

and Campbell 1961, Coble 1961). The preferred temperatures for spawning are between 39°F and 52°F (McEwan and Jackson 1996).

The length of time required for eggs to develop and hatch depends on water temperature and is quite variable; hatching varies from about 19 days at an average temperature of 60°F to about 80 days at an average of 42°F. The optimum temperature range for steelhead egg incubation is 46°F to 52°F (Reiser and Bjornn 1979, Bovee 1978, Bell 1986, Leidy and Li 1987). Egg mortality may begin at temperatures above 56°F (McEwan and Jackson 1996).

After hatching, pre-emergent fry remain in the gravel, living on yolk-sac reserves for another 4–6 weeks, but factors such as redd depth, gravel size, siltation, and temperature can speed or retard this time (Shapovalov and Taft 1954). Upon emergence, steelhead fry typically inhabit shallow water along perennial streambanks. Older fry establish territories that they defend. Streamside vegetation is essential for foraging, cover, and general habitat diversity. Steelhead juveniles are usually associated with the bottom of the stream. In winter, they become inactive and hide in available cover, including gravel or woody debris.

The majority of steelhead in their first year of life occupy riffles, although some larger fish inhabit pools or deeper runs. Juvenile steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Water temperatures influence the growth rate, population density, swimming ability, ability to capture and metabolize food, and ability to withstand disease of these rearing juveniles. Rearing steelhead juveniles prefer water temperatures of 45°F to 60°F (Reiser and Bjornn 1979, Bovee 1978, Bell 1986). Temperatures above 60°F have been determined to induce varying degrees of chronic stress and associated physiological responses in juvenile steelhead (Leidy and Li 1987).

After spending 1–3 years in fresh water, juvenile steelhead migrate downstream to the ocean. Most Central Valley steelhead migrate to the ocean after spending 2 years in fresh water (Hallock et al. 1961, Hallock 1989). Barnhart (1986) reported that steelhead smolts in California range in size from 14 to 21 cm (fork length). In preparation for their entry into a saline environment, juvenile steelhead undergo physiological transformations known as smoltification that adapt them for their transition to salt water. These transformations—different swimming behavior and proficiency, lower swimming stamina, and increased buoyancy—also make the fish more likely to be transported passively by currents (Saunders 1965, Folmar and Dickhoff 1980, Smith 1982).

In general, smoltification is timed to be completed as fish are near the fresh-water–saltwater transition. Too long a migration delay after the process begins is believed to cause the fish to miss the “biological window” of optimal physiological condition for the transition (Walters et al. 1978). The optimal thermal range for steelhead during smoltification and seaward migration is 44°F to 52°F (Leidy and Li 1987, Rich 1997), and temperatures above 55.4°F have been observed to inhibit physiological changes necessary to pass from fresh to saline waters, with concomitant reductions in migratory behavior and seawater survival (Zaug and Wagner 1973, Adams et al. 1975). Hallock et al. (1961) found that juvenile steelhead in the Sacramento Basin migrate downstream during most months of the year, but the peak period of emigration occurs in the spring, with a much smaller peak in the fall.

Steelhead usually spend 1–2 years in Central Valley waters and 1–4 years in the ocean before returning to their natal streams to spawn (Barnhart 1986, Busby et al. 1996). Juvenile survival in fresh water relies on suitable conditions which include hydraulic and structural complexity; pool and off-channel habitats used for rearing and refugia; production of aquatic invertebrates which serve as a prey base; and water which is cool, has sufficient oxygen, and is free of pollutants (Spence et al. 1996). Young steelhead also require sufficient flow to maintain optimal water quality and passage which is free of barriers.

Habitat alterations can affect predation rates by altering water flow, temperature, or velocity which may favor certain piscivorous fishes (Spence et al. 1996). In the Central Valley, habitat modification has resulted in elevated water temperatures and creation of slow-moving pools which has allowed many non-native piscivores to thrive in valley streams. These exotic species, such as small-mouth and large-mouth bass, striped bass, and others may be extensively preying on young salmonids.

Riparian vegetation greatly influences the biological and physical processes that provide freshwater habitat for salmonids. These processes include shade and cover, water quality and flow routing, the aquatic food web, sediment routing and composition, stream channel bedform and stability, and linkages to the floodplain (Beschta 1991, Gregory et al. 1991, Schlosser 1991, Sullivan et al. 1987). Nearshore areas provide valuable attributes for rearing and migrating juvenile salmonids including: (1) banks composed of natural, eroding substrates supporting riparian vegetation that either overhangs or protrudes into the water; (2) water containing variable amounts of woody debris, such as leaves, logs, branches, and roots, and often substantial natural detritus; and (3) variable water velocities, depths, and flows. In-water cover, from downed branches or trees or overhanging vegetation and irregular banks, enhances the diversity of the stream habitat and provides juvenile salmonids many opportunities for feeding and protection from predators.

The gradual and continuous loss of mature riparian habitat through levee and bank protection activities leads to lower stream productivity and increased homogeneity of the nearshore areas. Additionally, continued maintenance of denuded levees and riprapped banks eliminates the potential for revegetation and recovery of quality nearshore habitat for juvenile salmonids. Large areas that lack riparian vegetation limit the viability of the stream to support anadromous fish. Studies have shown high preference of juvenile salmon for natural shoreline areas, indicating that continued loss of riparian habitat could hinder the successful rearing of juvenile salmonids (U.S. Fish and Wildlife Service 1993).

### **Central Valley Steelhead Critical Habitat**

On February 16, 2000, the final rule designating Central Valley steelhead critical habitat was issued (65 FR 7764). Critical habitat consists of the water, substrate, and adjacent riparian zone of accessible estuarine and riverine reaches. Accessible reaches are those within the historical range of the ESU that can still be occupied by any life stage of steelhead. Inaccessible reaches are those above longstanding, naturally impassable barriers (e.g., natural waterfalls in existence for at least several hundred years) and specific dams within the historical range of each ESU. Critical habitat encompasses physical areas and their essential features including adequate: (1)

substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food, (8) riparian vegetation, (9) space, and (10) safe passage conditions.

Critical habitat for Central Valley steelhead is designated to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin Rivers and their tributaries in California. Also included are river reaches and estuarine areas of the Sacramento–San Joaquin Delta; all waters from Chipps Island westward to the Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay west of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco–Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Excluded are areas of the San Joaquin River upstream of the Merced River confluence and areas above specific dams (Black Butte Dam, Centerville Dam, Oroville Dam, Camp Far West Dam, Monticello Dam, Nimbus Dam, Keswick Dam, Whiskeytown Dam, Englebright Dam, Crocker Diversion Dam, La Grange Dam, Comanche Dam, Goodwin Dam, and New Hogan Dam) or above longstanding, naturally impassable barriers.

### *Impacts to Habitat in the Sacramento River Basin*

Profound alterations to the riverine habitat of the Central Valley began with the discovery of gold in the middle of the 19th century. Dam construction, water diversion, and hydraulic mining soon followed, launching the Central Valley into the era of water manipulation and coincident habitat degradation.

About 150 years ago, the Sacramento River was bordered by up to 500,000 acres of riparian forest, with bands of vegetation literally spreading 4–5 miles (Resources Agency 1989). By 1979, riparian habitat along the Sacramento River diminished to 11,000–12,000 acres or about 2 percent of historical levels (McGill 1979). More recently, about 16,000 acres of remaining riparian vegetation has been reported (McGill 1987). The degradation and fragmentation of riparian habitat have resulted mainly from flood control and bank protection projects, together with the conversion of riparian land to agriculture (Jones and Stokes Associates 1993). In addition, alteration of the Sacramento River's natural flow regime following construction of Shasta Dam has impaired the regeneration of riparian vegetation. Historically, the seasonal flow patterns included high flood flows in the winter and spring with declining flows throughout the summer and early fall. As flows declined during the summer, seeds from willows and cottonwood trees, deposited on the recently created sand bars, would germinate, sprout, and grow to maturity. Roots of these plants would follow the slowly receding water table, allowing the plants to become firmly established before the next rainy season. Similar habitat impacts have occurred on most of the important tributary rivers within the Sacramento-San Joaquin system.

Hydropower and flood control dams of the Central Valley Project (CVP) and the State Water Project (SWP) have permanently blocked or hindered salmonid access to historical spawning and rearing grounds. Downstream effects of these dams include significant alteration of: flow regimes, riparian functions and quality, geomorphic processes, and primary productivity of the stream. Diversion and storage of natural flows have altered the natural cycles on which juvenile and adult salmonids base their migrations and depleted river flows. Depleted flows have

contributed to higher temperatures, lower dissolved oxygen levels, and decreased recruitment of gravel and large woody debris.

Increased sedimentation resulting from agricultural and urban practices within the Central Valley is a primary cause of salmonid habitat degradation. Sedimentation has adversely affected salmonids during all freshwater life stages by clogging or abrading gill surfaces; adhering to eggs; inducing behavioral modifications; burying eggs or alevins; scouring and filling pools and riffles; reducing primary productivity and photosynthetic activity; and affecting intergravel permeability and dissolved oxygen levels. Embedded substrates have reduced the production of juvenile salmonids and hindered the ability of some over-wintering juveniles to hide in the gravels during high-flow events. Increased sedimentation also has been shown to increase water temperatures, thereby directly affecting incubating and rearing salmonids.

Land use activities associated with road construction, urban development, logging, mining, agriculture, and recreation have significantly altered fish habitat quantity and quality by altering streambank and channel morphology and ambient stream water temperatures; degrading water quality; eliminating spawning and rearing habitat; fragmenting available habitats; eliminating downstream recruitment of gravel and large woody debris; and removing riparian vegetation, resulting in increased streambank erosion. Agricultural practices have eliminated large trees and logs and other woody debris that otherwise would have been recruited to the stream channel. Large woody debris influences stream morphology by affecting pool formation, channel pattern and position, and channel geometry. In addition, unscreened water diversions for agriculture and municipal use have adversely affected salmonids through direct entrainment of emigrating juveniles.

Preliminary, significant steps toward the largest ecological restoration project yet undertaken in the United States have occurred during the past 4 years and continue to proceed in California's Central Valley. CALFED and the Central Valley Project Improvement Act's (CVPIA's) Anadromous Fish Restoration Program, in coordination with other Central Valley efforts, have implemented numerous habitat restoration actions that benefit Central Valley steelhead and their critical habitat. Restoration actions have included installation of fish screens, modification or removal of barriers to improve fish passage, and habitat acquisition and restoration. The majority of these recent restoration actions address key factors for decline of these ESUs, and emphasis has been placed on tributary drainages with high potential for production of Central Valley steelhead or other listed salmonids. Additional actions currently underway that benefit Central Valley steelhead include new efforts to enhance fisheries monitoring and conservation actions to address artificial propagation.

#### **IV. ENVIRONMENTAL BASELINE**

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species or its habitat and ecosystem within the action area.

## Status of the Listed Species and Critical Habitat in the Action Area

### *Central Valley Steelhead*

Generally, steelhead exist throughout the tributaries and headwater streams of the Sacramento and San Joaquin Rivers. Central Valley steelhead once inhabited drainages throughout the Sacramento and San Joaquin River systems. Historical run sizes in small drainages were likely several hundred fish that were specially adapted to the highly variable environment of small Central Valley drainages. No information is available about the presence, current distribution, and abundance of steelhead in Coon Creek. However, the species is assumed to occur in the stream, at least in some years, because it has been captured in the interconnected watershed of Auburn Ravine (Meyer pers. comm. in Jones & Stokes 1999). In addition, rainbow trout, the resident form of *O. mykiss*, are present in upper Coon Creek, which indicates that suitable year-round conditions for trout are present in the watershed. Ecological theory and genetic analyses suggest that Central Valley rainbow trout populations are polymorphic, i.e. all life-history forms (e.g. resident and anadromous) in a given stream system comprise a single population and progeny can assume a life-history pattern different from their parents (McEwan 2001).

The timing of steelhead upstream migration in Coon Creek would likely coincide with the onset of seasonal rains, usually from late October through April, when suitable conditions for migration and spawning are likely to occur. Spawning in the Sacramento River basin typically occurs from late December through May, with the majority of activity between January and March. Steelhead generally require water temperatures less than 57°F to spawn successfully. In March 2000, water temperatures in Coon Creek reached 60°F by the end of the month (Figure 1). Presently, the project area probably does not have suitable conditions for year-round rearing of juvenile steelhead because of the generally poor habitat conditions, elevated summer water temperature, and presence of non-native species. Nonetheless, Coon Creek probably serves as a migration corridor to upstream areas where habitat is more suitable. However, the section of the creek within Teichert property may provide suitable habitat during winter high-flow periods.

Coon Creek originates in the Sierra Nevada foothills at an elevation of approximately 2000 feet. Orr and Dry creeks join upstream of the project area to form Coon Creek. Coon Creek flows westerly through rolling, forested foothills approximately sixteen miles to State Route 65 which is at an elevation of 100 feet. Downstream of the project area, the creek flows across nearly level agricultural lands to the East Side Canal near Townbridge, in eastern Sutter County. The East Side Canal flows into the Natomas Cross Canal (NCC), which joins the Sacramento River immediately downstream of the confluence of the Sacramento and Feather Rivers. The average annual precipitation at the project site is approximately 24 inches (RDEIR 2000).

The portion of Coon Creek in the project area is in the pikeminnow-sucker headwater zone as defined by Moyle (1976). This zone typically is located within a narrow altitudinal band between 75 and 1,500 feet (ft) above mean sea level along the western edge of the Sierra Nevada foothills. Streams within this zone are characterized as small tributaries to larger streams that flow through open foothill woodlands of oak and foothill pine. In summer, these streams typically have low or intermittent flows and warm temperatures. During winter and spring, these streams have swift flows and are subject to flooding.

Streamflows in Coon Creek are generally controlled by releases from Orr Creek Reservoir, operated by Nevada Irrigation District (NID). NID uses Coon Creek to convey irrigation water to downstream agriculture operations. In the past, Coon Creek may have had little or no summer flow in the project area. Currently, however, it has continuous flow as a result of seasonal releases from NID facilities. Between April 15 and October 15, water purchased by downstream users is diverted into Coon Creek for delivery. Irrigation flows include water from Placer County Sewer Maintenance District 1. Discharge and surface drainage from the wastewater treatment plant are released into Rock Creek, a tributary to Dry Creek which flows into Coon Creek upstream of the project site. Releases into Rock Creek are estimated to range from an average of 1.5 million gallons per day (mgpd) during summer months to 5–8 mgpd during winter months.

Eight water diversions are permitted along Coon Creek in Placer County. In Sutter County, from Placer Road downstream to the Sacramento River, 41 additional permits to divert water have been granted. Most of these permits are for diversions along the NCC and East Side Channel. The timing, magnitude, and methods of permitted diversions vary. In general, diversions along Coon Creek, the East Side Canal, and the NCC are permitted from as early as April 1 until November 30. The allowable diversion rates average 5 cubic feet per second (cfs) and range from 0.34 cfs to 168 cfs (California State Water Resources Control Board file information). Although most of this water is diverted using pumps, at least three diversions on Coon Creek use a combination of pumps and an impoundment structure, such as a flashboard dam or sack dam. The permitted diversion seasons for the three diversion structures that use dams are May 1–November 1, April 1–October 1, and April 1–November 30. The flashboard dam on the Wilson Property, which is now Teichert property and part of the project site, is not equipped with a fish passageway.

No information is available about whether these permitted dams are adversely affecting anadromous fish populations in the Coon Creek drainage by blocking migration to and from the Sacramento River. The timing of diversions, however, suggests that adult steelhead attempting to migrate up Coon Creek from the Sacramento River after April 1 may be blocked by diversion dams. It is not known whether adult steelhead currently attempt to migrate up Coon Creek after April 1. Steelhead migrate in the Sacramento River until May. In addition, any juvenile steelhead and chinook salmon attempting to migrate downstream to the Sacramento River from the project area or above after April 1 could be adversely affected. During May 1997, Jones & Stokes biologists observed a temporary diversion dam that was blocking the entrance to the NCC at the Sacramento River while water was pumped into the NCC (S. Lee, JSA, pers.comm.). Under these conditions, all the water in the NCC was being diverted for irrigation. Downstream salmonid migrants, therefore, were not able to reach the river at that time.

## V. EFFECTS OF THE ACTION

This Opinion analyzes the effects of issuance of a Section 404 permit by the Corps for a mining operation by Teichert on threatened Central Valley steelhead (*Oncorhynchus mykiss*) and their designated critical habitat. The proposed action has the potential to take Central Valley steelhead through direct mortality of fish or through lowered reproductive success due to spawning habitat

degradation, and to adversely affect Central Valley steelhead critical habitat through decreased flows and bank modification. The following analysis examines the potential impacts.

#### Impacts to Streamflow and Groundwater

The topography of the Coon Creek watershed results in the most significant flooding occurring downstream of the project site where the creek enters the nearly level Central Valley floor in Sutter County. This only occurs during the winter rainy season when the majority of 24 inches of average annual precipitation occurs. During the summer low flow period the majority of flow in Coon Creek is NID water being delivered to agricultural users via the creek channel. Summer flows are variable depending on irrigation demands and the availability of water. Proposed mining operations have the potential to impact flows through the dewatering of mining areas which may cause a reduction in flows in Coon Creek. Groundwater pumping would dry the phased mining areas sequentially before they are mined by pumping from the alluvial and granite pits. Groundwater pumping would reduce the surface flows in Coon Creek by approximately 1.0 cfs during mining operations and 0.5 cfs after mining (Luhdorf and Scalmanini 1997). Based on a loss of 1.0 cfs, stream width and depth would be reduced by 2.1 ft and 0.1 ft, respectively. Because summer low flows range from approximately 12 to 34 cfs, a 1-cfs reduction represents 8% to 3%, respectively, of the total flow (FEIR 2001). The proposed mitigation to offset the potential losses includes monitoring flows and providing supplemental water within 24 hours of the detected loss. If flow measured at the upstream end of the project site is less than 40 cfs and reduced streamflows due to mining activity exceed 50% of the inflow to the project reach, replacement flow must be replaced within 24 hours of the detected loss. To ensure performance to this mitigation measure, a letter of credit or cash deposit in the amount of 125% of the value of 2,000 acre-feet of water (based on NID costs) shall be deposited with the Placer County Planning Department. Other mitigation measures proposed to offset any possible streamflow reduction include implementing the Coon creek riparian restoration plan, construction of a horizontal flow barrier to maintain water levels in the creek, and conversion of 180 acres of nonirrigated rangeland to irrigated farmland using Coon creek to convey the irrigation water. Adherence to the mitigation measures, as outlined in the FEIR, would minimize the potential to impact salmonids during mining operations.

In combination with the expected streamflow depletion associated with groundwater pumping (dewatering) of the mining areas, the timing and magnitude of Coon Creek flows would change. These changes are expected to be most noticeable during the irrigation season due to the natural hydrologic regime of summer and early fall when Coon Creek flows are dominated by NID deliveries (DEIR 1999). However, elevated summer creek temperatures are likely to inhibit salmonid presence in the project area during the irrigation season and until the first fall rains when temperatures have decreased to tolerable levels for salmonids. Juvenile steelhead may rear in Coon Creek in waters upstream of the project area where cooler temperatures may be maintained. It is expected that juvenile salmonids will not be harmed in any significant manner by these flow changes, but would avoid impacts by relocating if necessary.

Adult salmonids may be present in the area where the decrease in flow could occur, mainly during high flow periods, as they migrate upstream through the project area. A 1.0 cfs reduction in flow may cause a slight loss of migration, rearing, or future spawning habitat. No salmonids

have been observed spawning in the project area, however, studies have not been conducted on a regular basis. Adult salmon have been identified upstream of the project area and there is no reason that steelhead would not ascend upstream of the project area as well. Reduced streamflows, particularly in a drought year, could slightly reduce fish passage and abundance by reducing the amount of available fish habitat. However, because creek conditions in the project area are suitable for salmonids only during high-flow periods a 0.1 ft. reduction in water depth is not likely to have a significant impact. In order for steelhead to reach the project site there must be sufficient flow and corresponding depth in downstream areas which only occurs as a result of precipitation events.

Reduced streamflows could also cause an increase in water temperature. The greatest potential for impacts would occur when surface flows are at their minimum during periods of low natural runoff. Low flow periods in the action area coincide with elevated ambient air temperatures and consequent increased water temperatures, mainly from June through October. Potential impacts would be primarily limited to stream reaches adjacent to mining pits and attenuate downstream. Jones and Stokes placed a temperature recording device in Coon Creek from November 1999 through October 2000 (see Figs. 1 - 4). Water temperatures were recorded every hour at three locations: the upstream end of the project, the middle of the project, and the downstream end of the project. During summer 2000, temperatures from mid-May through the beginning of October exceeded 65 °F all the time and the majority of the time exceeded 70 °F (Fig. 2). It is unlikely that steelhead would be present during the summer months in the vicinity of the mining project because of the extreme summer temperatures. Central Valley steelhead have adapted to the climatic regime of the region and use various survival strategies during hot summer months including moving upstream to cooler headwaters, taking advantage of refugia such as thermally stratified pools (Nielsen et al. 1994), or moving downstream to cooler river waters or to the Delta. Summer water temperatures and low flow regime in Coon Creek in the project area have most likely always been naturally prohibitive to salmonid use.

Temperature data show slightly increasing water temperatures as water flows through the project area which may be due to the historic cattle grazing and the lack of riparian cover in the area. Revegetation will occur naturally as cattle are fenced out of the creek and as the restoration project is undertaken. Over time the increase in canopy cover would help keep summer water temperatures cooler within the project area offsetting an increase due to reduced flow. If flows are noticeably reduced, Teichert has proposed to purchase additional water from NID and have it flowing through the project area. However, because steelhead are not likely to be in the project area during the low flow period when temperatures are highest and when flow decreases would be most noticeable, summer mining operations would not directly effect steelhead.

Steelhead may be present in the project area during the fall, after flow increases attract upmigration, and in the early spring when increasing temperatures encourage outmigration. During the 1999/2000 winter season, stream temperatures at the downstream end of the project site were below 55 °F every day from December through early March (JSA 2000), however, steelhead fry may not emerge from gravels until after March and as late as May depending on time of spawning and water temperature during incubation. However, because at this time we have no information on steelhead spawning in the project area, we assume emerging fry will be unaffected by possible flow decreases in normal years. Teichert installed a stream gage in the

creek in 1994 and has collected stage data since that time. Teichert will continue to monitor flows during the entire mining operation and if decreases resulting from the operation are detected they will purchase additional water from NID to be conveyed through the project area and offset any decrease. Currently, use of NID water at the project site occurs from April 15 - October 15. Since steelhead are not likely to be in the project area before winter storms cause a natural increase in flows, they are not likely to be directly impacted by flow decrease during summer and early fall. Winter storm flows will offset any decrease during this time. Juveniles migrating downstream in spring may be using cues including flow decreases or water temperature increase to begin their downstream migration while conditions are still optimal downstream. If required, increases in flow purchased from NID may facilitate outmigration. Overall, the proposed flow mitigation measure and the temporal aspect of fish presence in Coon Creek would result in a low likelihood of direct effects to steelhead.

#### Channel Overflow Into Pits or Ponds

Mining pits which are formed during the mining process could capture Coon Creek flows during flood events, as could the reclamation ponds which will be created after mining ceases. Teichert's proposed design allows for overbank flows greater than or equal to the flow from a flood event with an average recurrence interval of 20 years (approximately 7750 cfs) to inundate mining pits or reclamation ponds (Murray, Burns, Kienlen Consulting Engineers 1996). During flood events, if a breach or capture were to occur, steelhead or salmon could become trapped within a mining pit or reclamation pond. Teichert proposes to minimize potential for the creek to overflow into a mining pit or pond by constructing an engineered hardened bank area at the point of anticipated overflow which should make a breach less likely to occur, however, during a large flow event this may not prevent pit capture from occurring.

Historically and presently, during extremely large flood events overbank flows flood the existing agricultural fields adjacent to Coon Creek at the upstream end of Teichert's proposed mining site and re-enter the creek channel approximately 1.7 miles downstream, near the confluence with Doty Ravine. This is the area where mining pits will be located during operations and the 222 acre pond will be located during the reclamation phase. Pit capture is most likely in sites where the mining pond lies in a shortcut for the flooding creek (Kondolf 1998) as it does in the project area.

Increase in impervious surfaces within a watershed increases the amount of stormwater runoff and may increase storm-generated flows (Dunne & Leopold 1978). Placer County is the second fastest growing county in California, with a 39 percent population increase during 1990-1999 (U.S. Census Bureau 2000). The impact of increased upstream urbanization into the future has the potential to increase stream flows which may cause overflow at storms of lesser severity than a 20-year event. However, the majority of any flooding resulting from Coon Creek flows occurs primarily downstream in Sutter County. In order to reduce the possibility of downstream flooding regional flood control solutions have been studied in western Placer and Sutter counties (RDEIR 2000).

The two proposed reclamation ponds will be large (222 and 123 acres) and should a breach or creek capture occur it may result in adverse affect to critical habitat, including: (1) modified

channel form by causing bank erosion and destabilization, (2) degraded water quality by adding pond water to the creek which may have elevated temperature, increased sediments, or other differing water quality parameters, and (3) altered channel processes affecting the integrity of riparian habitat if the channel permanently moves its channel. Pit capture may also result in decreased juvenile salmonid survival by providing opportunity for predation by non-native species likely to inhabit the ponds or pits, and by salmonids becoming trapped in the ponds. Because the creek habitat within the project area has not been identified as a spawning area, the change in habitat function, which could occur with a breach event if not expected to appreciably reduce the value of the critical habitat for the survival and recovery of the species, if the pit capture is a temporary short-term occurrence. Other floodplain mining activities have resulted in permanent pit capture where the channel changes its course, merging with the pits, transforming a lotic environment into a lentic environment which may render habitat less suitable for salmonids. For example, along the Merced and Tuolumne rivers, captured gravel pits constitute habitat for warm-water fish species that prey extensively on outmigrating juvenile salmonids (Kondolf 1998). Over 70% of juvenile chinook salmon migrating outward along a 8-km reach of the Tuolumne River were estimated to be lost by predation attributed to the presence of pit habitat (EA 1992 *in* Kondolf 1998). Currently, there are not sufficient data to estimate the potential losses of salmonids which could occur should pit capture occur on Coon Creek. The most prudent approach is to decrease the chance of pit capture to the maximum extent possible by implementing sufficient setback distances of mining areas to the channel. The mitigated design alternative includes locating the easternmost pond more than 1000' from the creek edge near the anticipated overflow area. This distance provides a much greater setback which appreciably reduces the chances of a breach event, reducing potential risk to salmonids.

Non-native fish species present in the Coon Creek drainage include carp, green sunfish, largemouth bass, and bullhead catfish. It would be possible for these fish to become established in the mining pit and for their abundance to increase. Escapement of additional non-native fish into Coon Creek could occur if the mining pit were flooded during seasonal flood events. Such escapement could lead to impacts on listed species in the Coon Creek drainage including its tributaries. Direct impacts include increased predation on juvenile steelhead and salmon by bass or other predatory fishes, and possible competition between salmonids and non-native fishes. If salmonids were to become trapped in a mining pit or reclamation pond after a breach, bass or other piscivorous fishes could prey on juvenile salmonids. However, the historic frequency of Coon Creek overflowing its banks shows it to do so very infrequently and only for a brief period of time, a day or so, when it does overflow. In 1986 a 50-year flood event occurred and in 1995 a 10-25 year flood event occurred in the area, however, Coon Creek did not flow out of its banks during these events (Murray, Burns, Kienlen Consulting Engineers 1998). During the lifetime of the thirty-five to forty year duration of mining activities Coon Creek may or may not overtop its banks and flow into the pits or ponds, however, should this event occur and if juvenile steelhead are present and become trapped in the ponds, the result may be a loss of a some portion of that year's cohort of steelhead within the Coon Creek drainage. This rare occurrence would not significantly impact the persistence of Central Valley steelhead in Coon Creek.

### Alteration of Flow Patterns

As active channels naturally meander, the channel may migrate over time towards the excavated area. The floodplain of Coon Creek in the project area lies almost completely south of the creek in the mining area. During a high flow that inundates the floodplain, the presence of stockpiles and overburden may cause flow alterations and fine material to be introduced to the creek (NMFS 1996). NMFS' 1996 National Gravel Extraction Policy recommends that pit excavations located on adjacent floodplain or terraces should be separated from the active channel by a buffer designed to maintain this separation for two or more decades. It is difficult to predict if the reclamation ponds for this criteria due to the inherent uncertainty of the annual hydrologic cycle; i.e. a 20-year flood event may occur in the Coon creek watershed next year or not for several decades. However, due to the small period of time a flood event large enough to breach the ponds would persist, it is unlikely that the active channel would attempt to permanently reroute itself through the ponds.

Mining within the floodplain may potentially restrict the channel from migrating in the future, however, due to the relatively large setbacks, the small size of Coon Creek, and the ephemeral nature of Coon Creek flows, the channel is unlikely to be restricted from migrating to the extent that it would naturally do so.

### Riparian Corridor

The current condition of the riparian habitat of Coon Creek is degraded in much of the project area, primarily due to years of cattle grazing. Teichert has proposed various measures to provide active and passive restoration along the Coon Creek corridor. These measures include: (1) avoiding any mining activity within the Coon Creek channel; (2) establishing a minimum 100-ft mining setback from the dripline of riparian growth along the north and south sides of Coon Creek; (3) fencing the entire 187.1-acre Coon Creek corridor; (4) removing and relocating the 18-acre feedlot north of Coon Creek on the Hofman Ranch; (5) removing wild reed, *Arundo donax*, along the entire creek corridor by mechanical means and EPA-approved herbicides; and (6) planting three active restoration areas totaling 45 acres with native species. The proposed restoration activities should result in an improvement in riparian habitat quality within the project area.

Teichert's proposed restoration efforts should provide a beneficial long-term increase in habitat quality and extent of riparian vegetation, most notably through enhancement of riparian vegetation, eliminating cattle use of the creek corridor, and providing passage at the water diversion dam. The current and historic land use on the site is cattle ranching which has resulted in bank degradation, downcutting, sedimentation, water quality degradation, and damage to riparian vegetation. Teichert's plans to fence cattle out of the riparian corridor and to implement several passive and active restoration projects would result in improved, localized bank stabilization and an increase in SRA habitat.

Teichert has proposed to mine adjacent to the riparian corridor but at least 100 feet from the dripline of the trees. Based on geographic information system information provided by the applicant, out of 20 measurements at 600 foot intervals, the average setback distance is 362 feet

and the maximum is 980 feet. Where there are currently no major riparian trees along Coon Creek the minimum buffer is 104 feet. Out of the twenty measurements, five were setbacks less than 150 feet. Mining may result in a loss of shallow groundwater storage which may result in a corresponding decrease in riparian vegetation growth and vigor. A lowering of the water table could also result in increased drought stress on riparian vegetation (Kondolf 1998). In areas where riparian revegetation is occurring this could require temporary increased irrigation in order to achieve restoration success goals, as outlined in the restoration plan.

### Turbidity and Suspended Sediment

No mining activities will occur in the active channel of Coon Creek or Doty Ravine, however, construction and mining activities adjacent to the stream may disturb soils or cause excessive dust which could lead to increased turbidity and sedimentation in the Coon Creek drainage. Increased turbidity levels for prolonged periods of time may adversely affect the ability of young salmonids to feed effectively, resulting in reduced growth and survival. Turbidity or sediment deposition may cause harm, injury, or mortality to juvenile chinook salmon or steelhead in the vicinity and downstream of the project area. High turbidity concentration can cause fish mortality, reduce fish feeding efficiency, and decrease food availability (Noggle 1978, Sigler et al. 1984). Turbidity and increased sediment has been shown to adversely affect juvenile steelhead by causing difficulty breathing, feeding, and migrating (Berg and Northcote 1985). Newcombe and MacDonald (1991) describe effects of suspended sediment on various salmonids as a function of amount and duration of exposure (a concentration-duration response). They list direct effects on salmonids ranging from an 80-100 percent mortality at the extreme to behavioral modification including increased coughing and alarm or avoidance response depending on the concentration-duration.

Other potential impacts associated with increased sediment levels are a decrease in aquatic invertebrates, a degradation of aquatic habitat, and a decrease in reproductive success due to inadequate dissolved oxygen within redds (Spence et al. 1996). The potential for increase in suspended sediments is expected to be less than the levels associated with these adverse effects, however, because of mining setbacks, use of best management practices and erosion control methods, and the use of aboveground desilting basins. Implementation of best management practices and monitoring return flows to Coon Creek should decrease the potential for significant turbidity or sedimentation resulting from mining practices. Adherence to the NPDES permit and the SWPPP would also minimize the potential for sedimentation to occur as a result of mining practices. Pit capture by the channel during a flood event may cause bank failure and erosion resulting in increased amount of sediment in Coon Creek which may adversely affect CV steelhead and cause degradation of their critical habitat by limiting feeding, silting in redds, filling in pools, and causing avoidance behavior around areas of high turbidity. A breach event has a low likelihood of occurring, and should it occur, sediment input would be a short-term impact. Removal of cattle from the Coon Creek channel, as part of this project, will allow banks to become revegetated, more stable, and decrease localized erosion caused by cattle which will, over time, result in a net decrease in fine sediment input to the creek.

## Blasting Operations

Underwater sound pressure levels of sufficient magnitude and frequency can affect all life stages of salmonids. Response to underwater sound pressure levels is affected not only by intensity (re 1  $\mu$ pa), but also by the frequency measured in cycles per second (Hz). Atlantic salmon (*Salmo salar*) have a hearing frequency range of 5–300 Hz, with the greatest sensitivity at 180 Hz, and are functionally deaf above 380 Hz (Hawkins and Johnstone 1978). Effects of low-frequency sound pulses on fish have been reviewed by BBN Systems and Technologies (1993). The review concluded that sound pulses at received levels of 160 decibels (dB) re 1  $\mu$ pa (pressure) may cause subtle changes in behavior, and stronger pulses (180 dB re 1  $\mu$ pa) could cause more noticeable changes.

The detonation of explosives in or near water produces compressive shock waves. These pressure waves can be lethal or cause serious injury to fish. The potential for mortality or serious injury to fish from blasting is related to several factors, including the type of explosive; the size and pattern of charges; the methods of detonation; the distance from point of detonation; the water depth; and the species, size, and life stage of fish. In general, eggs and larvae are more susceptible to the effects of vibrations caused by blasting than are juveniles and adults.

NMFS does not currently have guidelines regarding the effects of blasting on fish and minimization measures. The Canadian Department of Fisheries and Oceans, however, has developed some management practices and setback guidelines (Wright and Hopky 1998). These practices were developed to protect fish and their habitat from impacts resulting from the use of explosives in and near water. Teichert has proposed incorporating these practices in their operations. Adverse effects to steelhead or redds in Coon Creek could occur if blasting exceeded recommended levels. Currently, the location of spawning areas in Coon Creek is unknown, however, suitable gravels are in the creek within the project area and as habitat improves with riparian restoration activities spawning may be occurring on or adjacent to the project area. Any direct impact of blasting activities would likely be limited to fish or redds in the immediate area adjacent to mining activities. Critical habitat degradation could also occur as a result of blasting activities if a sufficient setback was not designated. For example, sedimentation resulting from the use of explosives may bury spawning areas or reduce abundance or diversity of aquatic invertebrate prey species. By-products from the detonation of explosives may include ammonia or other toxic compounds which may harm fish and other aquatic biota (Wright in prep.). Fish and eggs could be harmed or killed if blasting activities occurred adjacent to the channel when fish or redds were present. However, pre-blasting monitoring would insure fish are not present and use of blasting setback distances in accordance with the Canadian guidelines would substantially further minimize the chances of take or habitat degradation from occurring.

## Monitoring Programs

Monitoring programs prescribed for the project are not expected to have any appreciable effect on salmonids. Adult spawner surveys which will be done in conjunction with blasting activities are expected to have minimal effects on adult salmonids as the survey will utilize only visual observation techniques. Riparian revegetation monitoring would have no impact on steelhead or

their habitat. Monitoring is essential to insuring adverse affects to critical habitat are avoided, minimized, and that mining practices are reassessed and adaptively managed.

### Fish Migration Barriers

The water diversion on the Wilson property which is within the project area operates from April 1 - November 30 and may currently impede fish migration. Teichert is proposing to construct a fish ladder adjacent to the flashboard dam on the Wilson Ranch within 2 years of the commencement of mining activities as part of the project design. The fish ladder would be designed to provide adult and juvenile fish passage around the dam. Installation of a properly designed dam would provide salmonids with improved passage and access to spawning areas in upper Coon Creek. Construction impacts would be avoided by constructing the ladder during the summer low flow months when salmonids are not likely to be present in the project area.

### Overall Effects

Teichert's proposal to conduct mining within the floodplain of Coon Creek for a thirty-five to forty year period may result in slight chronic impacts to the hydrology and flow regime of the creek. These impacts may include decreased flows during natural low-flow periods; a reduction in the creek's ability to migrate over time within the floodplain in the mining area because the floodplain has been permanently altered and a portion replaced with a pond; the potential for channel degradation during flows above the 20-year flood; and a potential take of fish during a flood event of twenty years or greater if the flow enters the mining pits or after reclamation, one of the ponds. Also, chronic impacts to the water table may result during active mining from the dewatering process and post-mining because of the creation of two large lakes which intercept groundwater. These impacts would be minimized by the rare chance of their occurring and through implementation of mitigation measures and restorative actions, when needed. Overall, the potential impacts of Teichert's mining operation are not expected to affect the survival or recovery of Central Valley steelhead within Coon Creek or in the Central Valley ESU.

Adverse effects to critical habitat may occur if the channel migrates during high flows and joins with the ponds. This event could result in hydraulic and geomorphic alterations to Coon Creek such as bank scour or destabilization, sedimentation, and water quality degradation. If this were to occur, it is unlikely that any adverse impacts to the channel would persist downstream for a distance exceeding 1000 feet due to the topography of the site and the natural channel meander. However, implementation of the proposed mining project would also result in beneficial effects to salmonids and their habitat within Coon Creek. The rigorous riparian vegetation protective measures and restoration activities should have a net beneficial effect on the riparian and aquatic habitat in the project area. The installation of a fish ladder at the flashboard dam on-site should increase fish migration capacity. The monitoring efforts would add to the collective knowledge on salmonids within the watershed and provide information on physical characteristics including flows and temperature for as long as those data are being collected. Overall, the potential impacts of Teichert's mining operation are not expected to diminish the value of steelhead critical habitat.

## **VI. CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. For the purposes of this Opinion, the action area includes the Coon Creek drainage from just above the Gladding Road bridge downstream Coon Creek until it flows into the Cross Canal, and including the confluence with Doty Ravine and upstream Doty Ravine approximately one mile.

The only future actions which may occur in the action area that we are aware of are continued agricultural practices, including water diversions, which affect riparian vegetation, water quality, and flows in Coon Creek and Doty Ravine. Agricultural return water ditches flow directly into Coon Creek and greatly increase the turbidity of the low elevation portions of the watershed which must serve as migration corridors to salmonids. Water diversions along the creek will continue to potentially disrupt or preclude outmigration by smolts during spring months when outmigration coincides temporally with the start of irrigation season, typically in mid-April, but sometimes earlier. Potential fish passage barriers which may exist downstream of the project area may be examined by the Department of Water Resources Fish Passage Improvement Program. This could lead to future barrier removals or modifications which would enhance steelhead recovery within the Coon Creek drainage.

## **VII. CONCLUSION**

Based on the best available commercial and scientific information, a review of the current status of Central Valley steelhead, the environmental baseline for the action area, the effects of the proposed project and the cumulative effects, it is NMFS' biological opinion that the Army Corps of Engineer's issuance of a five-year permit for the Teichert mining project, as proposed, is not likely to jeopardize the continued existence of the threatened Central Valley steelhead ESU and is not likely to destroy or adversely modify designated critical habitat.

## **VIII. INCIDENTAL TAKE STATEMENT**

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. NMFS further defines "harm" as an act that actually kills or injures a protected species (64 FR 60727). Harm can arise from significant habitat modification or degradation where it actually kills or injures protected species by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and section 7(o)(2), take that is incidental to and not intended as part of the agency action is not considered to be prohibited take under the ESA provided that such take is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are nondiscretionary, and must be undertaken by the Corps so that they become binding conditions of any permit issued to Teichert, Inc., as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered under this incidental take statement. If the Corps: (1) fails to assume and implement the terms and conditions, or (2) fails to require Teichert to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or Teichert must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement [50 CFR §402.14(i)(3)].

#### Amount or Extent of Take

The proposed mining operations and restoration project within the Coon Creek watershed, as permitted by a five-year Corps 404 permit, is expected to result in minimal incidental take of Central Valley steelhead. There are no population estimates for salmonids using Coon Creek other than reports of rainbow trout present far upstream of the project site and adult fall-run chinook salmon sighted in Coon Creek less than 1 mile above the project site. Due to the paucity of information on steelhead use of Coon Creek, NMFS is unable to estimate the specific number of fish which could be taken during implementation of this project. Numbers of steelhead taken by either short- or long-term impacts to habitat will be difficult to quantify because dead or impaired individuals are difficult to detect, and because fish may be impacted by low flows and thus not be present but may be confined to downstream or upstream areas for certain periods of time. Take would occur if the creek channel connects to the off-channel reclamation ponds. This event could result in lethal take of juvenile salmonids by: (1) stranding fish in the ponds which will have unsuitable rearing conditions, especially during summer when water temperatures may exceed lethal levels and dissolved oxygen levels may be too low, or (2) predation by non-native fishes, such as largemouth bass, which will likely thrive in the ponds (they are currently present in the creek). Proper use of best management practices, pre-blasting monitoring, and the terms and conditions of this biological opinion should result in minimal take of listed fish. However, NMFS anticipates some take may occur during the five-year duration of the permit and anticipates it to be in the following forms:

- All rearing or migrating steelhead trapped in mining pits or reclamation ponds due to a breach occurring within the five-year duration of the Corps permit.
- All rearing or migrating steelhead that are delayed in their migration or prevented from using habitat for rearing due to decreased flows.
- All rearing or migrating steelhead harmed by sedimentation or other habitat quality impairment as a result of mining activities.
- All rearing or migrating steelhead impaired or disturbed by blasting noise or vibrations.

### Effect of Take

In the accompanying biological opinion, NMFS concluded that the anticipated level of take associated with the project action is not likely to jeopardize the continued existence of the threatened Central Valley steelhead ESU or result in destruction or adverse modification of critical habitat.

### Reasonable and Prudent Measures

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of Central Valley steelhead caused by activities related to Teichert's proposed mining project within the Coon Creek watershed:

1. Avoid all mining activities within the active channel and the riparian corridor and maintain appropriate setbacks to protect riparian resource values.
2. Avoid releasing any water to the creek which has elevated turbidity levels or temperature.
3. Avoid modification of stream flows caused by any mining activities.
4. Minimize the possibility of channel flow migration causing the creek to connect with the off-channel reclamation ponds or mining pits.
5. Minimize possible impacts to salmonids during blasting operations.
6. Minimize disturbance to the channel and avoid direct impact to salmonids during bridge construction.
7. Insure adequate passage around the summer dam is achieved and insure water diversions are not taking listed fish.
8. Insure restoration projects and reclamation plan are implemented and achieve desired success.

### Terms and Conditions

1. Avoid all mining activities within the active channel and the riparian corridor and maintain appropriate setbacks to protect riparian resource values.
  - A. Teichert shall limit their mining activities to areas outside the riparian corridor and creek channel with mining setbacks from the edge of active channel being a minimum of 300 feet horizontal distance from the outer edge of the channel in areas where there are no riparian trees or where the 100 foot setback from the dripline of the outermost oak trees would be closer than 300 feet.

- B. Teichert shall monitor floodplain encroachment by the creek during high flow periods for the duration of the mining phases located adjacent to the channel. If high flows are inundating mining areas, Teichert must increase their setbacks such that the creek does not overflow into mining areas except during 50 or 100-year flood events.
  - C. Teichert must provide NMFS with the monitoring reports and notify NMFS, Sacramento Area Office Supervisor at (916)-930-3600 immediately if the creek is flooding into mining areas. Teichert and NMFS biologists or engineers will develop a plan to modify setbacks and prevent continued flooding into mining areas.
2. Avoid releasing any water to the creek which has elevated turbidity levels or temperature.
- A. Teichert will monitor water which may be returned to the creek. Return flow water must have turbidity levels which do not exceed 10% above ambient creek conditions or exceed ambient creek temperature by more than 5 degrees F. These values are consistent with State Water Resources Control Board wastewater discharge permits and their sampling protocols should be followed.
  - B. If temperature or turbidity levels do exceed these limits, measures shall be implemented to insure compliance. Until compliance can be achieved, there should be no additional releases. Techniques to accomplish compliance may include using best management practices, for example, use of siltation or sediment ponds; lining the return water channel with clean rock to minimize erosion of the channel; and planting vegetation around the sediment basin to provide shading. If requested, NMFS shall assist in the development of an adaptive management plan. Before implementation of adaptive management techniques NMFS must approve the proposed methods.
  - C. If levels are in compliance, return water should be released into the creek in such a manner that its discharge does not cause bank or other erosion. This could be implemented through use of rock protection at the release site, or by other measures which have been accepted by NMFS.
  - D. A copy of the following permits or reports must be sent to NMFS: the erosion control and restoration plan which is to be implemented to comply with Section 401 of the Clean Water Act, the SWPPP, and the NPDES permit. Send to:  
  
Supervisor, Sacramento Area Office  
National Marine Fisheries Service  
650 Capitol Mall, Suite 8-300  
Sacramento, CA 95814-4706
3. Avoid modification of stream flows caused by any mining activities.
- A. Stream flow monitoring shall be conducted at three sites which include above the mining area, within, and below, before and during mining operations (as described in the DEIR).

- B. If a decrease is detected, NMFS should be contacted to review and approve the mitigation plan to modify flows. The plan may include measures such as adding additional flow from water purchased by Nevada Irrigation District conveyed via Coon Creek, or from other sources.
- C. Teichert shall provide a written report on all required surface and groundwater monitoring to NMFS annually, by January 1<sup>st</sup> of each year of mining operations, or at the completion of a particular segment or project. All reports shall be sent to:

Supervisor, Sacramento Area Office  
National Marine Fisheries Service  
650 Capitol Mall, Suite 8-300  
Sacramento, CA 95814-4706

- 4. Minimize the possibility of channel flow migration causing the creek to connect with the off-channel reclamation ponds or mining pits.
  - A. All mining pits and reclamation ponds should be designed and/or located the maximum distance possible from Coon Creek's active channel which would be a minimum of an additional 100 ft from the mining setbacks specified in Term and Condition #1. In the area south of the proposed overflow area the reclamation pond shall be designed to decrease the chance of a breaching during high flow events to the maximum extent possible.
  - B. If a breach does occur, all mining must cease in the pit into which the creek entered and NMFS must be contacted and approve of measures to repair the breach and fortify against another breach event. Contact should be made by phone at (916)-930-3600, or by fax at (916)-930-3629.
  - C. The applicant shall submit a copy of the Improvement Plan for design of the hardened overflow bank area to NMFS for approval prior to construction. Use of bioengineering techniques which include use of natural materials, such as willow cuttings, large woody debris, etc., (see Schmetterling *et al.* 2001) should be integrated in the design proposal to the maximum extent possible.
- 5. Minimize possible impacts to salmonids during blasting operations.
  - A. Teichert will use and adhere to the Canadian guidelines to determine minimum setback distances for blasting near any water course (Appendix II of Attachment A). As these guidelines are periodically updated, as they were December 6, 2000 (see Attachment A), Teichert shall keep abreast of the Canadian guidelines and update accordingly.
  - B. The use of explosives is prohibited within 1600 feet of any water course where adult or juvenile salmonids are present, where redds are present, or where eggs are developing. To protect riparian and aquatic habitat, blasting shall never occur within

400 feet of the active channel. Teichert may avoid impacts to salmonids from blasting by conducting all blasting activities between 400 and 1600 ft from the channel during the summer months when stream temperature exceeds 70°F and fish are unlikely to be present.

- C. A NMFS approved fishery biologist will be retained to conduct stream surveys to determine the presence or absence of any salmonids or redds prior to any blasting within 1600 feet of the creek, during the period of October 15 - April 30 unless or until stream temperatures have exceeded 65° F for redds and 70° F for adults and juveniles. No monitoring will be required during summer months May 30 - October 1. Surveys shall be conducted regardless of whether CDFG releases hatchery fish in the creek or not.
  - D. If blasting is conducted within 1000 feet of the creek, the NMFS approved biologist will monitor the stream channel to insure blasting has not caused any degradation to the channel, substrate, riparian vegetation, or water quality. If any impacts are detected blasting will cease immediately and NMFS will be notified and participate in the decision-making process to determine appropriate adaptive management actions.
6. Minimize disturbance to the channel and avoid direct impact to salmonids during bridge construction.
- A. The Corps and Teichert shall confine in-channel construction activities to the summer low-precipitation period (June 1 - October 15).
  - B. No fill material, including concrete, shall be allowed to enter any waters; channel disturbance shall be kept to a minimum; no material shall be left in the channel; the channel bottom elevation must not be elevated above the natural channel bottom.
  - C. Appropriate erosion control methods will be implemented during and after construction to prevent sediment from entering the channel.
  - D. All equipment refueling and maintenance will occur outside the creek and riparian area, except for any stationary equipment. No heavy equipment shall be operated in the channel or on the banks. To minimize the potential for fluid leaks during operation, refueling, or maintenance, spill control absorbent material will be placed under all stationary equipment.
  - E. Bridge and road shall be designed such that no direct discharge of road or bridge runoff, including that from culverts or bridge drains, runs directly into any waters including Coon Creek. Prior to construction, Teichert must submit the final bridge design and construction plan to NMFS for approval.

- F. If coffer dams are to be used, water pumped out of the dam which may be turbid should not be allowed to enter the channel unless sediment has settled out resulting in no increase in turbidity in Coon Creek or Doty Ravine.
  - G. Water that contacts wet concrete and has a pH greater than 9 must be pumped out and disposed of outside the creek channel in a location, such as into a detention pond, where it will not re-enter the flow .
  - H. Access to the creek must be designed to minimize removal of riparian vegetation. All vegetation that is removed or disturbed shall be replaced at a 3:1 ratio.
7. Insure adequate passage around the summer dam is achieved and insure water diversions are not taking listed fish.
- A. The fish ladder shall be designed by qualified personnel which may include engineering staff from NMFS, and other agencies. Proper design must include insuring adequate flows are present to make the ladder function properly. Final design is subject to NMFS acceptance.
  - B. All in-channel work shall be done during June 1 - October 15.
  - C. After installation, periodic monitoring should be conducted to insure the ladder is functioning properly and not clogged with debris. Teichert shall maintain the ladder in perpetuity or until the water diversion is no longer in operation.
8. Insure restoration projects and reclamation plan are implemented and achieve desired success.
- A. Teichert shall implement and adhere to all mitigation measures outlined in the FEIR.
  - B. No herbicides shall be used within the riparian area without NMFS' prior approval of their use. Other vegetation control techniques not requiring chemical application should be examined for feasibility.
  - C. Teichert should put sufficient funds into escrow for management of the project area into perpetuity which may be used for restoration and maintenance of the area after thirty-five to forty years of mining.
  - D. Teichert shall implement all restoration activities as described in this biological opinion and submit a copy of the annual monitoring report on the revegetation activities to the NMFS, Sacramento Area office.

## **IX. CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

NMFS believes the following conservation recommendations are consistent with these obligations, and therefore should be implemented by the Corps.

1. The Corps shall encourage Teichert to continue to work cooperatively with the Auburn Ravine/Coon Creek CRMP, and other State and Federal agencies, private landowners, local governments, and NID to identify opportunities for cooperative analysis and funding to support salmonid habitat restoration projects, conduct stream surveys, and monitor fish populations within the Coon Creek watershed. Teichert and NID are the largest stakeholders in the watershed and as CRMP participants they should take the lead to work together to help benefit and restore steelhead in the watershed by improving the habitat and removing barriers.
2. The Corps shall encourage Teichert to take advantage of programs such as Department of Water Resources Fish Passage Improvement Program, the U.S. Fish & Wildlife Service and California Department of Fish & Game's Anadromous Fish Restoration Program (AFRP), and Calfed to identify fish barriers within the watershed; to identify, fund, and design restoration opportunities; and to help design fish passage around the summer dams including the one on Teichert property. Using these resources should allow implementation of fish passage improvements prior to two years after commencement of mining operations which should benefit listed salmonids and help offset mining impacts.
3. The Corps shall ensure this project does not exceed the limitations set forth in the RWQCB Basin Plan for the beneficial use of cold freshwater habitat; migration of aquatic organisms; and spawning, rearing, and early development. This includes restrictions on increases in water temperature, turbidity, and reduction of dissolved oxygen.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, NMFS requests notification of the implementation of any conservation recommendations.

## **X. REINITIATION NOTICE**

This concludes formal consultation on the effects of the proposed Teichert mining project on Central Valley steelhead. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or authorized by law) and if: (1) the amount or incidental take specified in the incidental take statement is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this

opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species not considered in this opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be initiated immediately.

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## PERSONAL COMMUNICATIONS

- Troy Reimche, Propert Manager, Teichert Inc. 2000, 2001.
- Susan Lee, Biologist, Jones and Stokes, 2000, 2001.

## **Enclosure 2**

### **Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) Essential Fish Habitat Consultation**

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) set forth new mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils, and federal action agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate "essential fish habitat" (EFH) in fishery management plans (FMPs) or FMP amendments for all managed species. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding potential adverse effects of their actions on EFH.

#### **I. IDENTIFICATION OF ESSENTIAL FISH HABITAT**

Essential fish habitat is defined in the MSFCMA as: "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity..." NMFS regulations further define "waters" to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" to include sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" to mean the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" to cover a species' full life cycle.

The geographic extent of freshwater essential fish habitat (EFH) for the Pacific coast salmon fishery includes waters currently or historically accessible to salmon within specific U.S. Geological Survey (USGS) hydrologic units (PFMC 1999). For the action area within the Coon Creek watershed the aquatic areas that may be identified as EFH for Pacific salmon are within the USGS hydrologic unit map numbered 18020109.

Very little information is available about the presence, current distribution, and abundance of salmon in Coon Creek. There are reports of adult fall-run chinook in Coon Creek near the Gladding Road bridge, which is located upstream of Teichert's proposed mining project. The timing of fall-run chinook upstream migration in Coon Creek would likely coincide with the onset of seasonal rains, usually from October through December, when suitable conditions for migration and spawning are likely to occur. Lower Coon Creek probably serves as a migration corridor to upstream areas where habitat is more suitable. However, the section of the creek within Teichert property may provide suitable habitat during winter high-flow periods.

General life history information for chinook salmon is summarized below. Further detailed information on chinook salmon ESUs are available in the NMFS status review of chinook salmon from Washington, Idaho, Oregon, and California (Myers et al. 1998), and the NMFS proposed rule for listing several ESUs of chinook salmon (NMFS 1998).

Central Valley fall-run chinook enter the Sacramento and San Joaquin Rivers from July through April and spawn from October through December (FWS 1998) with spawning occurring from October through December. Peak spawning occurs in October and November (Yoshiyama et al. 1998). Chinook salmon spawning generally occurs in swift, relatively shallow riffles or along the edges of fast runs at depths greater than 6 inches, usually 1-3 feet to 10-15 feet. Preferred spawning substrate is clean loose gravel and gravels are unsuitable when they have been cemented with clay or fines or when sediments settle out onto redds reducing intergravel percolation (NMFS 1997).

Egg incubation occurs from October through March, and juvenile rearing and smolt emigration occurs from January through June (Reynolds et al. 1993). At the time of emergence from their gravel nests, most fry disperse downstream towards the estuary shortly after they emerge or as smolts (Kjelson et al. 1982), hiding in the gravel or stationing in calm, shallow waters with fine sediments substrate and bank cover such as tree roots, logs, and submerged or overhead vegetation. Juvenile rearing occurs from January through mid May and the smaller fry inhabit marginal areas of the river, particularly back eddies, behind fallen trees, undercut tree roots or over areas of bank cover (Lister and Genoe 1970). Juvenile emigration occurs from mid March through mid June. Chinook salmon fry prefer slower velocity streambank areas and orient upstream to the current as opposed to the smolt stage that swims downstream with the current (Schaffter 1980). As they grow, the juveniles associate with coarser substrates along the stream margin or farther from shore (Healey 1991). Along the emigration route, submerged and overhead cover in the form of rocks, submerged aquatic vegetation, logs, riparian vegetation, and undercut banks provide food, shade and protect juveniles from predation.

Principal foods of chinook salmon while rearing in freshwater and estuarine environments are larval and adult insects and zooplankton such as *Daphnia*, flies, gnats, mosquitoes or copepods (Kjelson et al. 1982), stonefly nymphs or beetle larvae (Chapman and Quistdorff 1938) as well as other estuarine and freshwater invertebrates.

## **II. DESCRIPTION OF PROPOSED ACTION**

The proposed action is described in Part II of the associated biological opinion (Enclosure 1).

## **III. EFFECTS OF THE ACTION**

Potential impacts of the Teichert gravel mining project to Pacific coast salmon EFH would be similar to the effects of the action discussed in the associated biological opinion concerning impacts to threatened Central Valley steelhead. These impacts may include (1) disturbance from in-channel construction activities; (2) degradation of water quality from increased suspended

sediment or other pollutants; and (3) decrease in water quantity from dewatering activities; or (4) channel modification and associated habitat degradation if a breach occurs with the reclamation ponds.

The potential impacts of the bridge construction should be short-term and localized to a small area. They may include harassing fish if they were present, causing sediment to enter the creek, and removal or disturbance of riparian vegetation. Construction work windows during the low-flow summer period should greatly minimize the potential for adverse effects on salmon by avoiding them altogether, and use of construction best management practices would minimize other potential effects. Adherence to the discharge permit requirements for return water to Coon Creek shall minimize the potential for adverse effect arising from water quality degradation. Additional water would be conveyed down Coon Creek as a mitigation measure should a 50 % decrease in flow be detected, within the mining area, during mining operations. There may be an impact to salmon if a decrease in flows occurs yet is below the 50% mitigation level. Potential impacts may include a migration barrier in the low flow area, a decrease in available habitat, and an increase in water temperature. A channel breach may occur during a 20- year flood event and should this occur, the result may be adverse effects to EFH including channel erosion, increased sedimentation, predation on juvenile salmon, and trapping of juvenile salmon in ponds.

#### **IV. CONCLUSION**

Upon review of the effects of the Teichert gravel mining project, NMFS believes the proposed project will enhance the EFH of Pacific salmon through restoration of riparian habitat along Coon Creek and installation of a fish ladder ought to improve fish passage conditions. However, implementation of the mining project may also adversely affect EFH of fall-run chinook salmon in Coon Creek due to short-term channel disturbance from bridge construction, and potential future channel modification if the flow breaches the reclamation ponds.

#### **V. EFH CONSERVATION RECOMMENDATIONS**

NMFS recommends that Reasonable and Prudent Measures Nos. 1 and 2 and their respective Terms and Conditions listed in the Incidental Take Statement prepared for Central Valley Steelhead in the associated Biological Opinion be adopted as EFH Conservation Recommendations. In addition, NMFS recommends that the following measures be adopted as EFH Conservation Recommendations. These recommendations are provided as advisory measures:

1. The Corps, or Teichert, shall ensure that impacts resulting from project construction are minimized for the duration of the project.
2. The Corps, or Teichert, shall ensure that the six pumps, and associated flashboard or other dams, used to divert water from Coon Creek in the project vicinity are not impacting migration of adult or juvenile salmon; entraining juvenile salmon; or causing any adverse effect to water quality including increased water temperatures, decreased dissolved oxygen levels, or release of sediment into flowing water during dam removal.

3. Teichert should explore other opportunities within the Coon Creek drainage to participate in or fund projects to restore or preserve riparian, stream channel, and floodplain habitat.
4. Teichert should put funds into escrow for management of the project area into perpetuity which may be used for restoration and maintenance of the area after cessation of mining.
5. Teichert shall immediately inform NMFS if flows from Coon Creek breach into the mining pits or reclamation ponds and NMFS shall be allowed to provide technical expertise on how to proceed with operations and channel repairs following the breach.

## **VI. ARMY CORPS OF ENGINEERS' STATUTORY REQUIREMENTS**

The MSFCMA and Federal regulations (50 CFR Sections 600.920) to implement the EFH provisions of the MSFCMA require federal action agencies to provide a written response to EFH Conservation Recommendations within 30 days of their receipt. A preliminary response is acceptable if final action cannot be completed within 30 days. Your final response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendations, you must provide an explanation of the reasons for not implementing them.

## **VII. REFERENCES**

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Coon Creek, Downstream End of Project Area  
November 1999 through April 2000

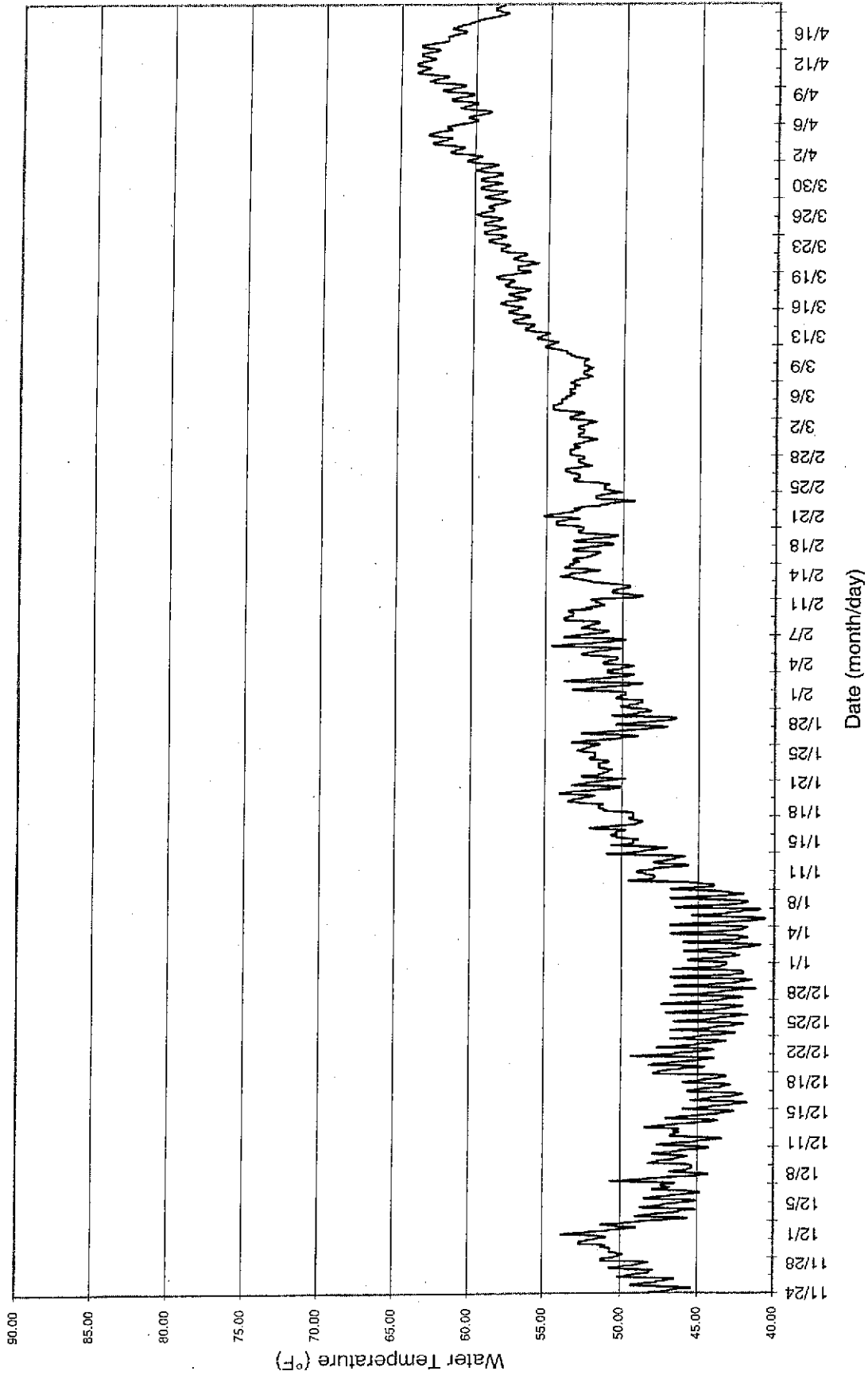


Figure 1

Coon Creek, Downstream End of Project  
April through October 2000

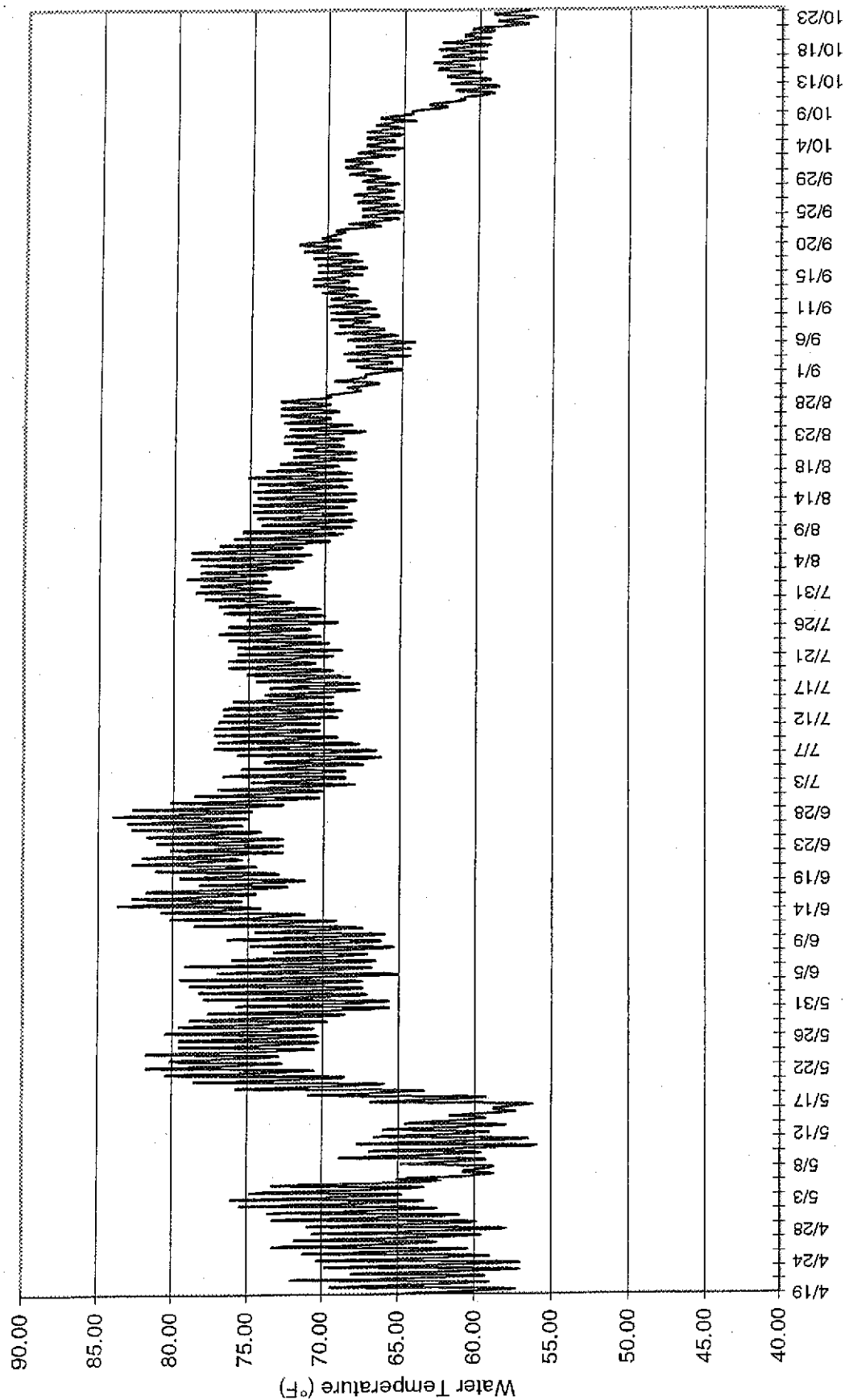


Figure 2

Coon Creek, Middle of Project Area  
April through October 2000

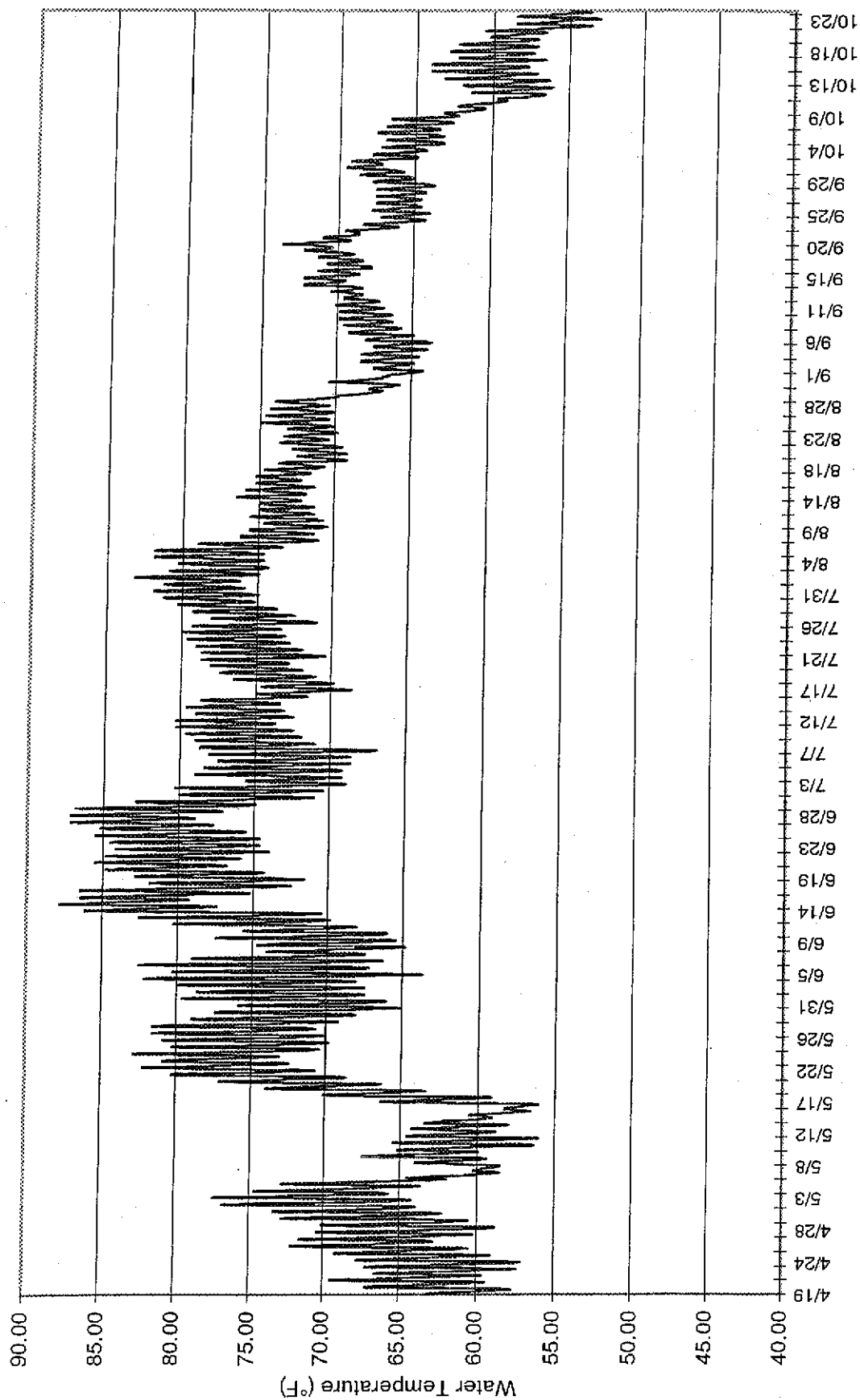


Figure 3

Coon Creek, Upstream End of Project Area  
April through October 2000

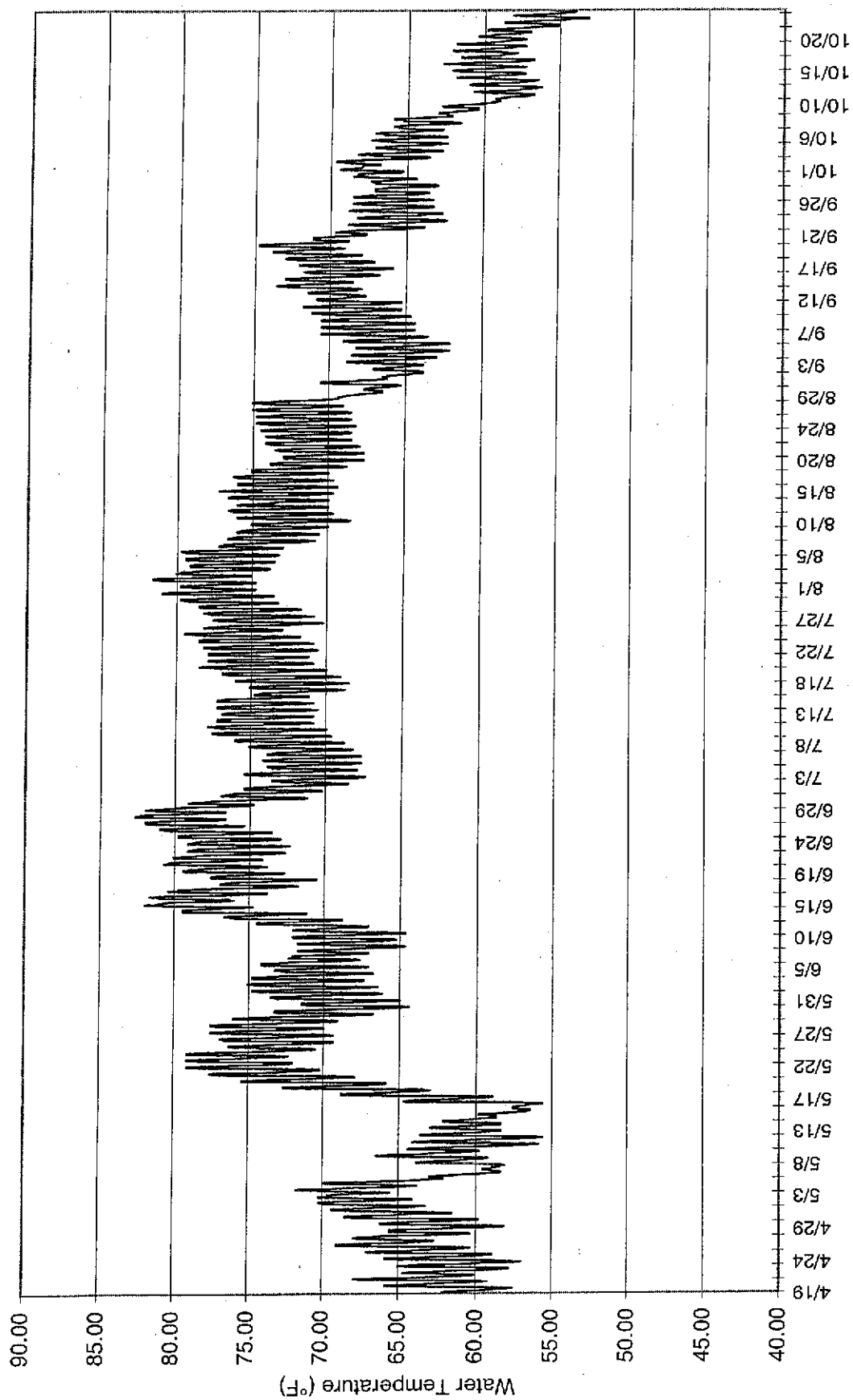


Figure 4

# Attachment A

**Erratum:** Updated as of December 6, 2000

Wright, D.G., and G.E. Hopky. 1998. Guidelines for the use of explosives in or near Canadian fisheries waters. Can Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p.

**Table 1.** Setback distance (m) from centre of detonation of a confined explosive to fish habitat to achieve 100 kPa guideline criteria for various substrates.

Substrate Type	Weight of Explosive Charge (kg)							
	0.5	1	2	5	10	25	50	100
Rock	3.6	5.0	7.1	11.0	15.9	25.0	35.6	50.3
Frozen Soil	3.3	4.7	6.5	10.4	14.7	23.2	32.9	46.5
Ice	3.0	4.2	5.9	9.3	13.2	20.9	29.5	41.8
Saturated Soil	3.0	4.2	5.9	9.3	13.2	20.9	29.5	41.8
Unsaturated Soil	2.0	2.9	4.1	6.5	9.2	14.5	20.5	29.0

**Table 2.** Setback distance (m) from centre of detonation of a confined explosive to spawning habitat to achieve  $13 \text{ mm} \cdot \text{sec}^{-1}$  guideline criteria for all types of substrate.

	Weight of Explosive Charge (kg)						
	0.5	1	5	10	25	50	100
Setback distance (m)	10.7	15.1	33.7	47.8	75.5	106.7	150.9

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## Appendix II

### General Equations to Determine Setback Distance for Confined Explosives to Meet Guideline Criteria of 100 kPa

#### Equation (A)

Equation (A) describes the transfer of shock pressure from the substrate to the water.

$$P_W = \frac{2(Z_W / Z_R)P_R}{1 + (Z_W / Z_R)}$$

where:

$$P_W = \text{pressure (kPa) in water}$$

$$P_R = \text{pressure (kPa) in substrate}$$

$$Z_W = \text{acoustic impedance of water}$$

$$Z_R = \text{acoustic impedance of substrate}$$

#### Equation (B)

Equation (B) describes the relationship between acoustic impedance and the density and velocity of the medium through which the compressional wave travels.

$$Z_W / Z_R = \frac{D_W C_W}{D_R C_R}$$

where:

$$D_W = \text{density of water} = 1 \text{ g}\cdot\text{cm}^{-3}$$

$$D_R = \text{density of the substrate in g}\cdot\text{cm}^{-3}$$

$$C_W = \text{compressional wave velocity in water}$$

$$= 146,300 \text{ cm}\cdot\text{s}^{-1}$$

$$C_R = \text{compressional wave velocity in substrate in cm}\cdot\text{s}^{-1}$$

#### Equation (B) (continued):

The following values are used for  $D_R$  and  $C_R$  for various substrates:

Substrate	$D_R$ (g•cm <sup>-3</sup> )	$C_R$ (cm•s <sup>-1</sup> )
Rock	2.64	457,200
Frozen Soil	1.92	304,800
Ice	0.98	304,800
Saturated soil	2.08	146,300
Unsaturated soil	1.92	45,700

### Equation (C)

Equation (C) describes the relationship between the peak particle velocity ( $V_R$ ) and the pressure, density and compressional wave velocity in the substrate.

$$V_R = \frac{2 P_R}{D_R C_R}$$

### Equation (D)

Equation (D) represents the scaled distance relationship and is used to equate the peak particle velocity to charge weight and distance.

$$V_R = 100 (R/W^{.5})^{-1.6}$$

where:

$$\begin{aligned} V_R &= \text{peak particle velocity in cm} \cdot \text{s}^{-1} \\ R &= \text{distance to the detonation point in m} \\ W &= \text{charge weight per delay in kg} \end{aligned}$$

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Table 1. Estimated Setback Distance: General Fish Habitat

Confinement	Weight of Explosive per Delay	
	293 Pounds	479 Pounds
Average confinement	160 feet	200 feet
Highest normal confinement	270 feet	350 feet
Sinking cut confinement	410 feet	520 feet

Source: Calculated from information provided in Canadian Department of Fisheries and Oceans 1994.

Table 2. Estimated Setback Distance: Spawning Habitat

Confinement	Weight of Explosive per Delay	
	293 Pounds	479 Pounds
Average confinement	460 feet	590 feet
Highest normal confinement	800 feet	1,030 feet
Sinking cut confinement	1,210 feet	1,550 feet

Source: Calculated from information provided in Canadian Department of Fisheries and Oceans 1994.